March 1986 £1.00

AMSTRAD COMPUTER USER

Hang it On The Telephone

Serial Interfaces Checked Out

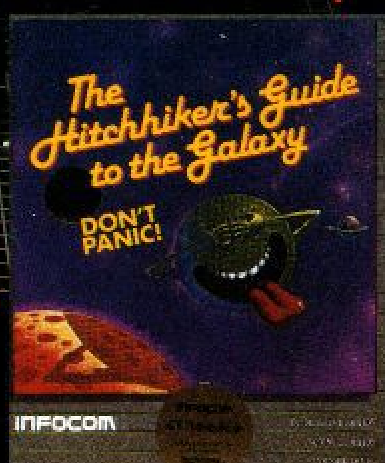
Laser Basic-Games Made Simple



Free Business Supplement

Preview: Rainbird Music Systems

Plus! Pages of News, Reviews and Listings



Game of the Month

CONTENTS

REGULARS

FEATURES

LISTING

OFFERS

REVIEWS

ABC

AMSTRAD COMPUTER USER

169 King's Road, Brentwood, Essex CM14 4EF.
Telephone: 0277-234434. Telecom Gold: 72:MAG012

Editor: Simon Rockman
Advertisement Manager: Jane Nolan

The OFFICIAL magazine for users of Amstrad computers

News trade distribution: Europress Sales & Distribution Ltd, 11 Brighton Road, Crawley, West Sussex RH10 6AF. Tel: 0293 27053.

AMX Mouse is compatible with all six modules of **Mini Office II**
Word Processor ● Database ● Spreadsheet
Graphics ● Communications ● Label Printer

We thought it was about time we put you in the picture.

When we introduced our AMX Mouse to micro-users, the response was phenomenal.

And no wonder!

Hailed by the press as 'probably the best input device that has arrived recently', the AMX Mouse brings to AMSTRAD CPC users, the same sophisticated, positive control that has, until now, been the province of more expensive computers – like the Macintosh.

The fantastic AMX Mouse Package opens up an entirely new and exciting world to AMSTRAD users and comes complete with Mouse, its own interface and these fabulous programs.

AMX ART

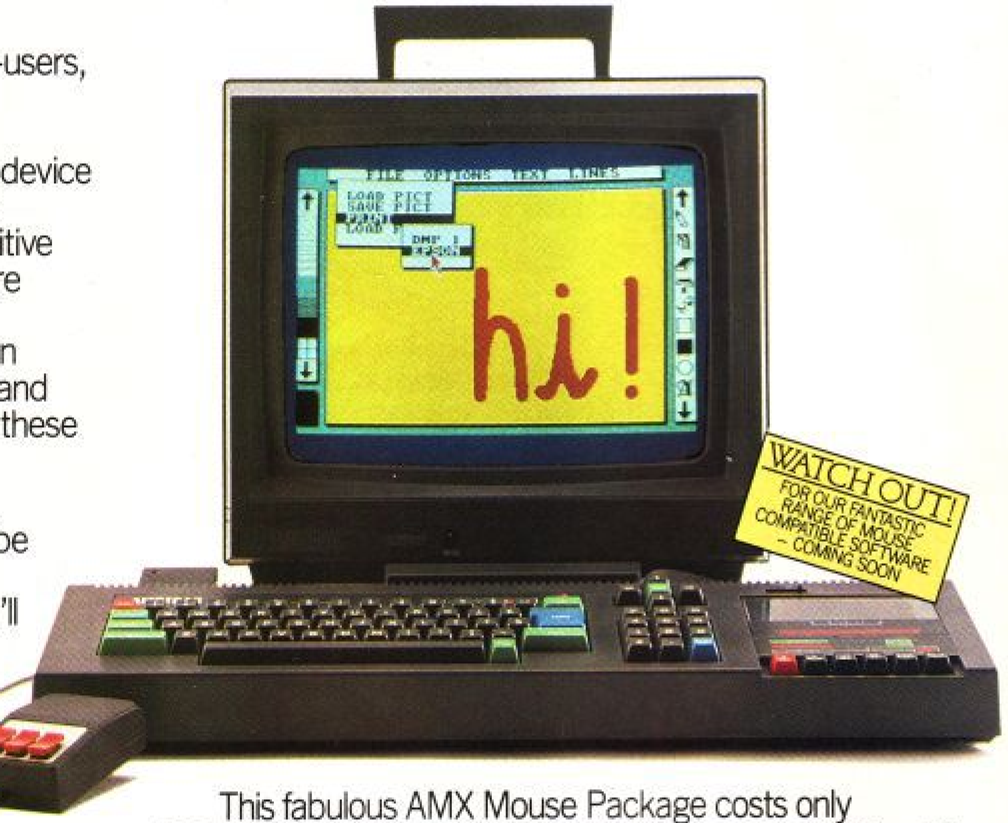
This computer aided, drawing program has to be seen to be believed. Making full use of on-screen windows, icons, pull-down menus and pointers, you'll be simply astonished at the quality of work you can produce, store and print. There is even a pattern design program which gives you an unlimited number of designs for use in your own drawings.

It's a program that can give hours of family fun and at the same time is ideal for serious professional applications.

AMX CONTROL

Now you can create a 'Mouse' environment in your own programs, AMX Control adds extra commands to normal Basic and features two programs.

1. The machine code program to extend the Basic interpreter which gives you full use of windows, icons and pointers.
2. An Icon designer, an individual program for creating and storing icons for use in your own programs. The number and variety of icons you can create is limited only by your needs and imagination.



This fabulous AMX Mouse Package costs only £69.95, a price as remarkable as the package itself and it includes a fully illustrated operating manual.

The software is supplied on cassette, and 3″ Disc. The AMX Mouse Package is compatible with Amstrad CPC 464, CPC 664 and CPC 6128.

Ordering couldn't be easier.

This superb package is available from all good computer dealers or direct using the freepost order form below.

So what are you waiting for?
Get into the picture now!

£69.95 INC. VAT.



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AMX MOUSE AMSTRAD PACKAGE/S
AT £69.95 EACH INCL. VAT AND P & P.

I ENCLOSE CHEQUE/POSTAL ORDER FOR £ ________

OR DEBIT MY ☐ ACCESS
(TICK AS APPROPRIATE) ☐ VISA

CARD NO. ________________

EXPIRY DATE ________________

SIGNATURE ________________

NAME ________________
(BLOCK CAPITALS PLEASE)
ADDRESS ________________

________________ POSTCODE ________

AMX MOUSE

IMAGINATION AT YOUR FINGERTIPS

SEND TO: ADVANCED MEMORY SYSTEMS LIMITED, FREEPOST, WARRINGTON WA4 1BR.

CA

User News...

Amstrad makes 1,000,000

Sometime in January the one millionth Amstrad computer was sold. There was no fanfare, no presentation, no one even seems to know if computer number 1,000,000 was a 464, 6128 or 8256.

One million is a heck of a lot – do you realise that if all the Amstrad computers were put side by side they would reach from London to Paris (the ones in the middle would get a bit wet).

Some time ago Amstrad had to have new moulds made for the green screen monitors after the originals started to wear out.

Amstrad computers are now sold in nearly every country this side of the Iron Curtain and we have even heard of journalists using them to report back to London from Moscow. If you know of an Amstrad which is put to a good, unusual use, particularly in an industrial application then drop us a line. We have had letters written with a Joyce from all kinds of interesting places – The House of Commons and Rolls Royce to name just two.

Lovely RITA

Alan Sugar is *the* personality of the year, and that's official.

RITA stands for Recognition of Information Technology Achievement. This year the Awards were sponsored by the BBC Micro Live programme and Carners Exhibitions who organised the Which Computer Show.

AMX stuff on its way

New software to run in conjunction with the AMX mouse is due for release any time now. AMX Utilities complements the facilities already available with the AMX graphics package.

It includes full page scrolling, cut and paste, and a 'ram disc'. The cassette version will sell for £14.95 and a disc will be £19.95.

Also planned is Pagemaker. Currently getting rave reviews on the BBC, Pagemaker is a typesetting and graphics package which enables A4 pages to be produced. It is intended for making letter headings, posters and newsletters.



National computer games champ has been found

Rian Hulme has just been presented with his trophy for winning the first National computer games championship run by Mikro-Gen.

If you would like to enter the 1986 competition contact Mikro-Gen, Unit 15, The Western Centre, Western Road, Bracknell, Berks. RG12 1RW.

Galaxians strike back

Those sneaky invaders the Galaxians really got their revenge last month. A couple of the rotters swiped half the listing for Galaxians Revenge when we weren't looking.

So that you can get the program working and wreak havoc in the skies, here are the missing lines:

```
2240 DATA 04,00,03,03,04,03,00,00, 17
2250 DATA DC,00,00,00,00,00,00,00, 220
2260 DATA 00,00,00,00,00,00,00,00, 0
2270 DATA 00,00,00,00,00,00,00,00, 0
2280 DATA DD,21,30,53,06,0C,C5,DD, 821
2290 DATA E5,CD,88,57,FE,00,CA,20, 1145
2300 DATA 55,CD,41,56,3C,3C,3C,3C, 681
2310 DATA 32,FF,51,21,FF,51,DD,7E, 1102
2320 DATA 00,3D,BE,FA,29,54,C3,4A, 895
2330 DATA 54,C6,09,BE,F2,32,54,C3, 1052
2340 DATA 4A,54,21,F7,51,DD,7E,10, 882
2350 DATA BE,F2,3F,54,C3,4A,54,D6, 1146
2360 DATA 08,C3,ED,52,C3,4A,54,CD, 1067
2370 DATA F0,55,DD,7E,20,FE,01,CC, 1163
2380 DATA 78,54,FE,02,CC,9C,54,FE, 1158
2390 DATA 05,CC,30,55,FE,06,CC,48, 878
```

While we are owning up to errors there are a couple of other things that readers have drawn our attention to.

Pak Caverns: This works perfectly on the 464 but uses the variable name 'frame'. As 'FRAME' is a keyword on the 664 and 6128, used as a variable name it will give a 'syntax error'. The solution is to change all the references to 'frame' to something legal, such as 'fram'.

Roland Takes a Running Jump: This works perfectly using a disc system but causes problems on a cassette system. The solution to this one is to delete the '.bin' extension to the filename in line 140 of listing 2.

On a cassette system, the computer takes the filename to be 'GAME.BIN'. On disc the filename is taken as 'GAME'.

Computers against drugs

The Softaid tape sold to raise money to aid famine relief in Ethiopia is to be followed by 'Off the Hook'.

This is another games compilation tape where the proceeds will be donated to the fight against drug abuse. Like the Softaid tape, Rod Cousens, managing director of Electric Dreams, has organised the release.

He has lined up an impressive list of contributing software houses including Activision, Beyond, Elite, Firebird, Gremlin Graphics, Melbourne House, Ocean and US Gold. A tape will be available in the spring for £6.99 but there is no word about which machines it will be available for.

It is hoped that the sale of the tape will bring in at least £100,000. The Softaid tape raised £322,000 for the Ethiopian Famine Appeal.

Winners of the AMX mouse competition

If you entered our AMX mouse competition – and loads of people did – then here are the results you have been waiting for. There were 14 differences between the two pictures.

AMX mice will be scampering to: M. Parsons, Ashford, Middlesex; B.G. Ewart, Cosby, Leicestershire; David Parish, Bideford, N. Devon; L.J. Dundon, Reading, Berks; A. Greenway, Blackheath, London; S. Lailey, Yeovil, Somerset.

Away the lads (with the stamps)

Amsoft Mail Order and the Amstrad User Club has relocated to Sunderland. Their new address is:

AMSOFT
Victoria House
PO Box 10
Sunderland
Tyne and Wear SR1 3PY
Phone number: 0783 673395.

Any enquiries should be sent to this new address. They are bound to be in a bit of a muddle to start off with so don't be too annoyed if they take an extra couple of days to send you the stuff. They talk in hushed tones of some really exciting things happening in the middle of February.

Unwanted

Not for sale. Classified adverts in ACU. Don't reply to Box no. 464.

Sorry we are no longer taking classified adverts or semi-display. The smallest ad we can take is an eighth of a page. For further details phone Jane Nolan on (0277) 234434.



Kiwi make the connection

Now all the Amstrad computers can receive Prestel. KiwiSoft have recently released KiwiChat, a terminal program which works with the Amstrad CPS8256 interface on the Joyce.

The software allows you to use your modem to connect to Prestel or Viewdata. There are no colours of course – because of the monochrome screen – but all the graphics and screen positioning are there.

The program also has an ordinary terminal mode with buffered receiving and transmission of files catered for. Another menu option saves your most useful hardware configurations to disc for you to call up next time you use it.

KiwiChat costs £39.95 and you can reach KiwiSoft at 27 Old Highway, Hoddesdon, Herts, EN11 0LS.



Super Show

THE second Amstrad Computer Show held at the Novotel, Hammersmith, turned out to be a roaring success. The 'cellar' in which the first show was held had been abandoned by the organisers in favour of the more upmarket hall upstairs. Despite the additional room, the show was often crowded and difficult to move in. However, tempers survived and most people got to see the things they wanted.

Amstrad's stand was particularly busy as people clamoured to see the machines on show. There were a large number of enquiries about the complexities of the 8256 and Locoscript.

Dk'tronics were showing their range of peripherals and there was a great deal of interest in their new memory expansion packs. Another company showing an expanded Arnold were Screens who were exhibiting the Vortex 512k expansion pack. This had some very impressive demonstration software running.

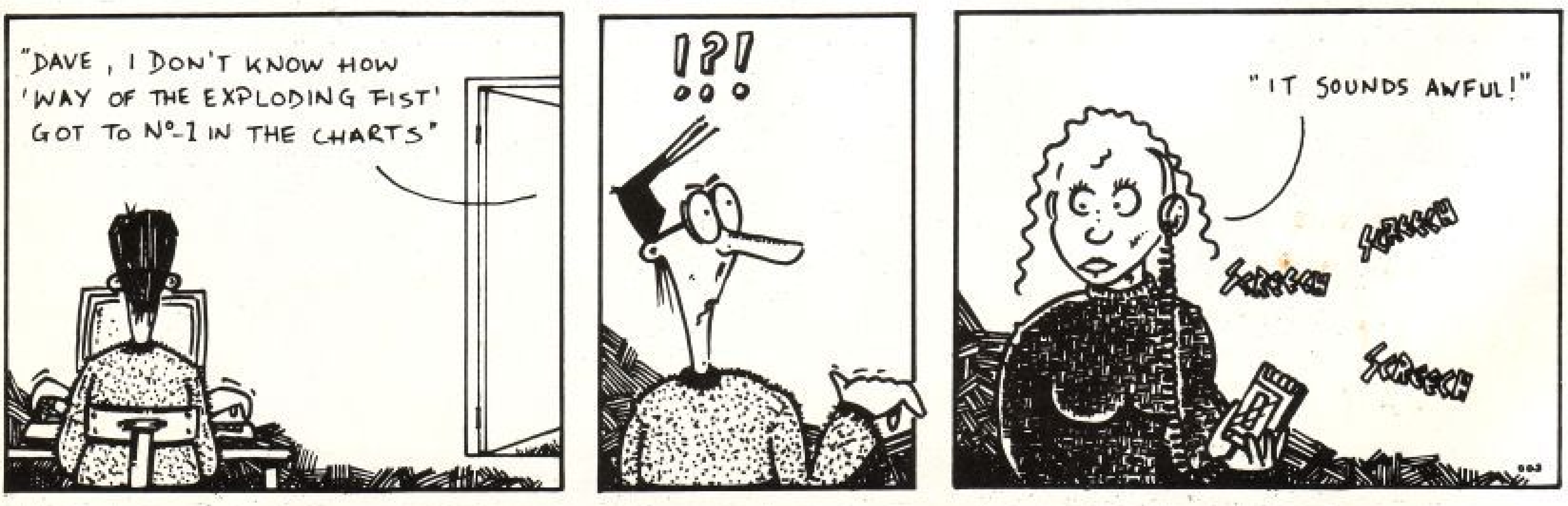
Communications is an area where there is growing interest and several new products for the Amstrad were being shown. Pace were showing their Prestel package for the PCW8256, including modem and Honeysoft software. KDS were showing their new Prestel software for the CPC range.

Business software for the 8256 and 6128 was well represented. Digital Research, suppliers of CP/M, were showing latest versions of DR Draw and DR Graph. Sagesoft had their range of software for the 8256 while Arnor and Tasman were selling their utilities and word processors.

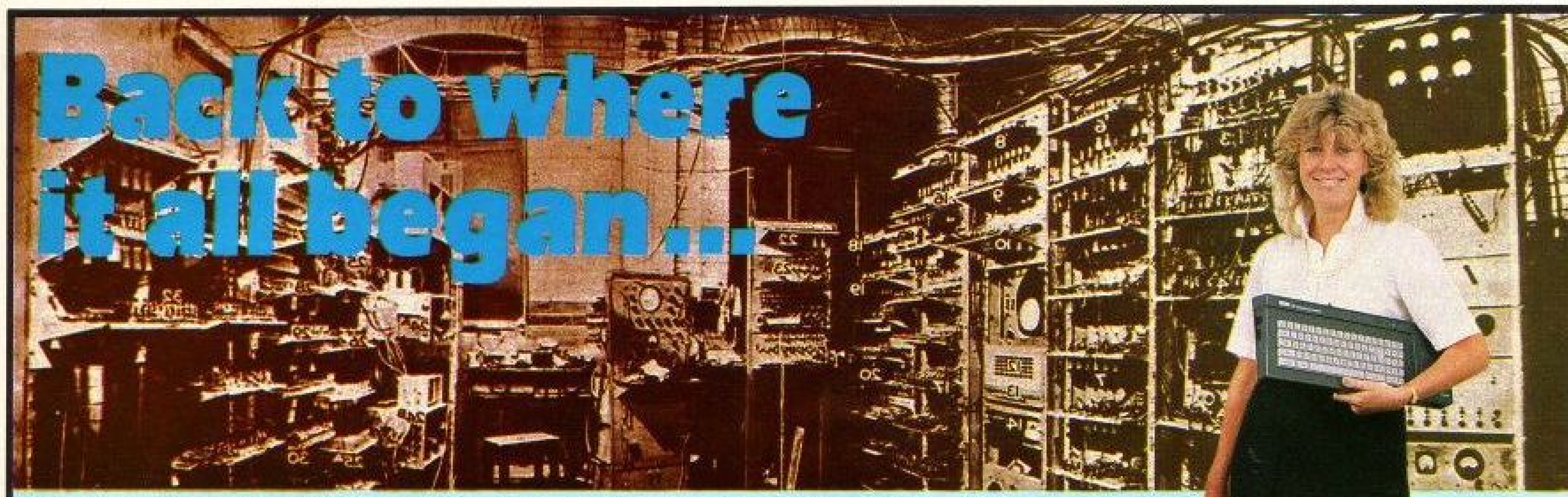
Of course Newstar had a stand and they were obviously doing well selling New Word and their other titles.

Database Publications who organise the show had a stand near the main entrance and were selling their own software titles. Database intend to stage another show in Manchester in March so see you there.

DAVE and PAM by ALEX & SPITAL



Back to where it all began...



On June 21, 1948, a group of distinguished scientists witnessed the birth of the world's first stored program computer, pictured here. Built mainly out of war surplus thermionic valves, it proved to be far too large for the room in which it was to be housed and so overflowed into the corridor. It was known as the Manchester Mark 1.



NOW – nearly 30 years later – the city which saw the birth of the computing revolution is about to host an event dedicated to a range of machine no bigger than typewriters and costing only a fraction of the price, yet infinitely more powerful than their giant grandaddy. For this is to be the . . .

FIRST NORTHERN AMSTRAD COMPUTER SHOW

The first two Amstrad Computer Shows played to packed houses in London. Now the event comes to Manchester, and with even more to offer . . .

- New hardware and software products galore.
- Special offers from all the leading companies.
- Free helpful advice from the Amstrad experts.

If you own an Amstrad – or are just thinking about buying one – this is the show you cannot afford to miss!

Organised by Database Publications

New Century Hall,
New Century House,
Corporation Street,
Manchester M60 4ES

Saturday, March 22 – 10am to 6pm
Sunday, March 23 – 10am to 5pm

Avoid the queues!

Get your ticket in advance and

SAVE £1 A HEAD!

Advance ticket order

AMSTRAD COMPUTER SHOW
New Century Hall, Manchester
March 22-23

Please supply:

☐ Adult tickets at £2 (save £1) .... £ ________
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Total £ ________

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Admission at door:
£3 (adults), £2 (under 16s)

Post to: ***Amstrad Show Tickets, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.***

Name ....

Address ....

....

.... Signed ....

PHONE ORDERS: RING SHOW HOTLINE: 061-429 7931
Please quote credit card number and full address + Ref. ACU 3

Arnor LTD

PROTEXT

FOR AMSTRAD 464/664, 6128

THE ULTIMATE AMSTRAD WORD PROCESSOR!!

PROTEXT is without doubt the most sophisticated word processor you will find on any home micro. It is of comparable standard to business packages costing over £200 but has been developed for the AMSTRAD 464/664 and 6128 machines and is 100% machine-code. We know that PROTEXT is the fastest program of its type currently available (eg global search and replace on a three page file in under a second!). Bearing in mind the range of features included and their ease of use, this package is rightly acclaimed as the No. 1 word processor for Amstrad owners. Compare these features and benchmarks with any other similar products.

BENCHTESTS

A standard file of 775 words (4,785 characters) was used to carry out the following benchtests (all timings are in seconds):

	PROTEXT	TASWORD/AMSWORD
1 LOAD text file	4.7	10.2
2 SAVE text file	4.9	18.9
3 Re-FORMAT paragraph (85 words)	0.4	15.3
4 Re-FORMAT entire text	2.5	Not Possible
5 Move directly to start of text	under 0.1	2.2
6 Move directly to end of text	0.2	2.2
7 REPLACE 'the' with 'THE' (45 occurances)	1.7	34.1
8 SCAN entire text	2.2	7.2
9 MERGE file to centre of text	4.0	Not Possible
10 MERGE file to end of text	3.8	12.4
11 MOVE 85-word paragraph	under 0.1	6.8
12 PROGRAM LOAD TIME DISC / ROM	12.9 / Instant	14.6 / Not Available

PROTEXT FEATURE SUMMARY

File commands – Super fast Load, Merge and Save, Cat, Print (to printer/screen/file).
Cursor Movement – By character/word/line/paragraph/screen, to start or end of line, to start or end of text, to line number, to place marker, to margin.
Inserting and deleting – Insert/overwrite mode, insert character or line, delete character forwards or backwards, delete word.
FIND and REPLACE – Wildcards, all or part of text, case specific, whole word or part of word, find control codes.
Block commands – Move/copy/delete/save/print/format.
Markers – 2 block markers and 10 place markers may be set anywhere.
Formatting – Word wrap, right justify, variable left and right margins.
Ruler lines – Unlimited number of ruler lines to define margins and tabs.
Print options – Headers/footers, page numbers, variable line spacing, variable page length and margin sizes, conditional page throws, odd and even page features, continuous or single sheets, multiple copies.
Printer features – Including emphasised, condensed, double-strike, elite, italics, enlarged, pica, NLQ, subscript, superscript, underline. Built in Epson printer driver. Ability to easily define your own printer driver and save to disc.
Help features – Optional on screen command summaries.
Built in character sets – Danish/French/German/Italian/Spanish/Swedish.
Other features – Non break space, display tabs, returns and hard spaces, soft hyphens, word count, case conversion, copy ruler. 40 page easy to read manual with full index and glossary of terms.

"I AM STUNNED AT PROTEXT — IT KNOCKS POCKET WORDSTAR INTO A COCKED HAT" — AMTIX ISSUE 1 **"DON'T MISS IT. IT IS SUPERB"** — POPULAR COMPUTING WEEKLY
"MILES AHEAD OF THE AMSWORD TYPE PROGRAMS" — AMSTRAD USER

NOW TWO POWERFUL NEW ADDITIONS TO YOUR WORD PROCESSING SYSTEM:-

PROSPELL

Checks your spelling!
Proof reads your documents

● **Works directly from PROTEXT** ●

A single command brings the spelling checker into action.

Correct errors while viewing the document.

Add new words to dictionary disc either as they occur or all together for extra speed.

PROSPELL works with all ASCII files from other word processors as well.

● **Many Options** ●
—if040Including — add words to dictionary / ignore word / correct spelling / delete words / list words / word count / analysis of words in text / copy dictionary / initialise new dictionary / plus lots more!!

● **Version A . . . PROSPELL on DISC** ●

Thousands of words on dictionary disc.
Add your own words up to around 100,000 per dictionary disc
Any number of dictionary discs can be used

● **Version B . . . PROSPELL on DISC and ROM** ●

Program and dictionary of common words on ROM
Main dictionary on disc.
More text space and incredible speed.
Thousands of words have been packed into 16K ROM for really fast operation.

And you thought PROTEXT was fast!!

PROMERGE+

This major addition to the PROTEXT word processor combines a fully flexible mail merge program allowing PROTEXT to produce individualised documents in one single print run.

(a) COMPREHENSIVE MAIL MERGE

Read data from file or keyboard.
Merged fields of varying lengths are automatically reformatted.
File merge — insert file while printing.
Conditional printing — select from input data (eg you could print letters to all customers whose name is not Smith).
Compatible with Masterfile extension.

(b) PROTEXT ENHANCEMENTS

Background printing — edit one file while you print another.
Print file direct from disc or memory.
Two file editing — switch between two files in memory.
Cut and paste — any block of text can be moved to any position — allows multiple column layout.
Auto configuration — you can set up a disc to configure PROTEXT to your preferred options with a single keystroke.
Typewriter mode — for envelopes etc.
BASIC program editing — direct from memory.
Calculator — a simple on-screen calculator for those invoice totals, etc.

● **6128 OWNERS** ●

These features make full and sensible use of your extra 64K memory but also function with smaller files on the 464 and 664 machines. **DISC £24.95**
ROM £34.95

MAXAM ASSEMBLER

Now recognised as the industry standard assembler/monitor/editor. Used by all the leading software houses, computing magazines and widely used throughout industry.

"This piece of software should be held up as an example of what can be done by programmers who care. It is brilliant."
ELECTRONICS & COMPUTING

"MAXAM is a superb ROM which is recommended for all serious machine code programmers. It contains a powerful assembler and an excellent editor which is a joy to use."
COMPUTING WITH THE AMSTRAD

"ARNOR are to be congratulated on a superb job . . . definitely the best."
HOME COMPUTING WEEKLY

"A product no serious Amstrad user can afford to be without."
YOUR COMPUTER

Why make machine-code difficult?
Why use anything less than MAXAM?

PROTEXT and **MAXAM** are available on cassette, disc, rom and plug-in cartridge.

CASSETTE AND DISC
The inexpensive introduction to the Arnor professional software.
Cassette £19.95 **Disc £26.95**

ROM
For those people who already own a rom expansion box. Just plug in a rom and off you go. Arnor roms are compatible with all other rom boxes.
EPROM £39.95

PLUG IN CARTRIDGE (AD2)
Complete Plug-in-and-go ROM cartridge containing either PROTEXT or MAXAM. NO ROM BOXES REQUIRED! In addition, the cartridge has a thorough connector for further peripherals and an extra socket for expanding the system with our own 4 way rom board. The AD2 cartridge plugs directly into the 464, 664 or 6128, fitting snugly into the expansion port. Fitting a PROTEXT cartridge means that as soon as you switch your Amstrad computer on, PROTEXT is instantly ready and waiting for you to use.

Consider the price of our cartridge system. Just £10 onto the price of the rom software and no extra hardware required. Why pay twice as much to get started?

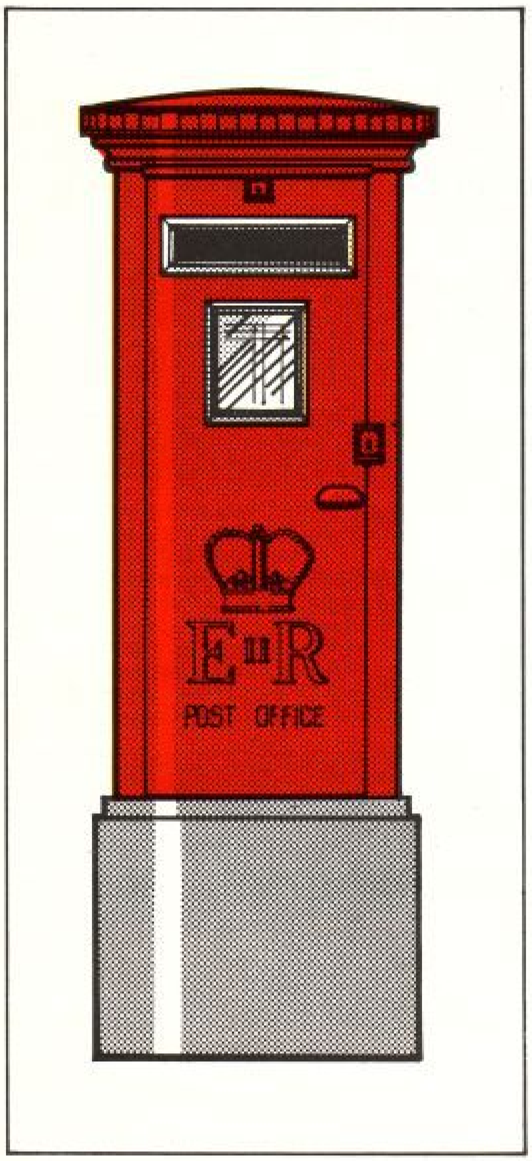
AD2 cartridge (PROTEXT or MAXAM) with no extra hardware required **£49.95**
4 WAY ROM CARD (plugs into cartridge) **£15.95**

REMEMBER . . . ROM and cartridge software gives you a massive 40K text space!!

Coming soon Mailmerge and Spelling Check programs for Protext users.

Please bear in mind that the views expressed herein are not necessarily those of Amstrad or Amsoft. Be assured that all your views are given thorough consideration. This letters section is the Amstrad Computer User's own forum.

Write to reply



DMP2000 fact or fiction?

I am the proud owner of a CPC464 computer. I have been looking for a suitable printer to use with it for some time. I saw the DMP2000 being demonstrated at the PCW Show in September and decided that it was the best value for money.

When I enquired how long it would be before it was available, I was told it would be available before Christmas. Well, here we are in 1986 and still no sign of it. I knew it was too good to be true. Will it ever be available, or is it just a figment of some marketing managers imagination. If it does appear, will it be at the £160 price?

K.A. Woodcote,
Watford, Herts.

They do exist!

I'm not normally given to writing to magazines, computer or otherwise. Some computer manufacturers and dealers get a lot of flak, much of it no doubt deserved, but I really must tell someone about the excellent service provided by Amsoft. *(There must be someone else using the name Amsoft – Ed.)*

Very tempted by the reviews of the DMP2000 printer I ordered one on 11th November. "Available mid-November" looked a bit ominous but I was a Spectrum owner before getting my 664 so I'm used to delays and the printer certainly looked worth the wait.

11th December arrived bringing the January issue of ACU plus the User Club Newsletter. This looked ominous too – "overwhelmed with orders", ". . . sold all stock . . . second week of January . . ." I thought prepare yourself for a long wait, Jimbo!

Then in the afternoon the mail van appeared with a parcel. Yes, here was my DMP2000 in all its glory. Exactly 28 days and despite "overwhelming orders". I suppose I must have been near the top of the list but I still think it was pretty good going.

So what's my verdict? I've only had a couple of days on the printer but all seems very good indeed. The manual is excellent, easy to follow even for a novice. I've configured Tasword and tried MasterCalc's screen-dump – nice and clear; pretty fast too. Still waiting for yours? Patience – it's worth every penny. What? You haven't ordered one? Hurry up and do so!

Thanks again to all at Amsoft. As soon as finance allow I'll be on to you for an FD-1. Thanks too Ed for an excellent magazine, though I'm glad of CPC User Soft's discs when it comes to those long, long listings.

Mr J. Ormerod,
Rossendale, Lancs.

ACU: It's nice to hear from at least one satisfied customer. However, the DMP2000 is obviously very thin on the ground at the moment. Amsoft have a large backlog of orders although they might be willing to put you on a waiting list. This is due to the high demand for the printer.

Cartoon fun?

We were very disappointed to find that you had included a sexist cartoon in the February issue of Amstrad Computer User. Not all women are afraid of mice (although some men are), and to imply that a woman would be stupid enough to be afraid of a mechanical 'mouse' hardly counts as humour. We have read computer magazines over the last eight years and apart from advertising (more noticably in American publications), there has been little to complain about on this issue. It is of course true that micro-computing is male dominated, but this is no excuse for the attitude expressed in the offending cartoon. Surely a successful magazine like yours could do better than this?

Mark Mason, Meryl Philippart,
Margaret Robins, Franco Rabaiotti,
John Waters,
Computers;
Adapted Software for
the Disabled (CASH),
Swansea, W. Glamorgan, S. Wales.

ACU: It has never been our intention to offend any section of our readership. (It would be foolish to do so). We are always sensitive toward peoples feelings and go out of our way to avoid publishing controversial or offensive material. In this case we have published a cartoon that derives its humour from a stereotype, as cartoons do. This should be seen only as an attempt to entertain and not be taken too seriously. Anyway the joke wouldn't be the same if it was the AMX Earwig.

Is my PCW8256 only a tool?

Until December '85 I knew next to nothing about home computers, nor wanted to. I bought a PCW8256 because it brought complete word-processing within my price range. The machine is ideal for the purposes for which I acquired it and I'm delighted with it. However, just because I'm not an 'Arcade Freak', does it mean the machine must never be used for recreational purposes?

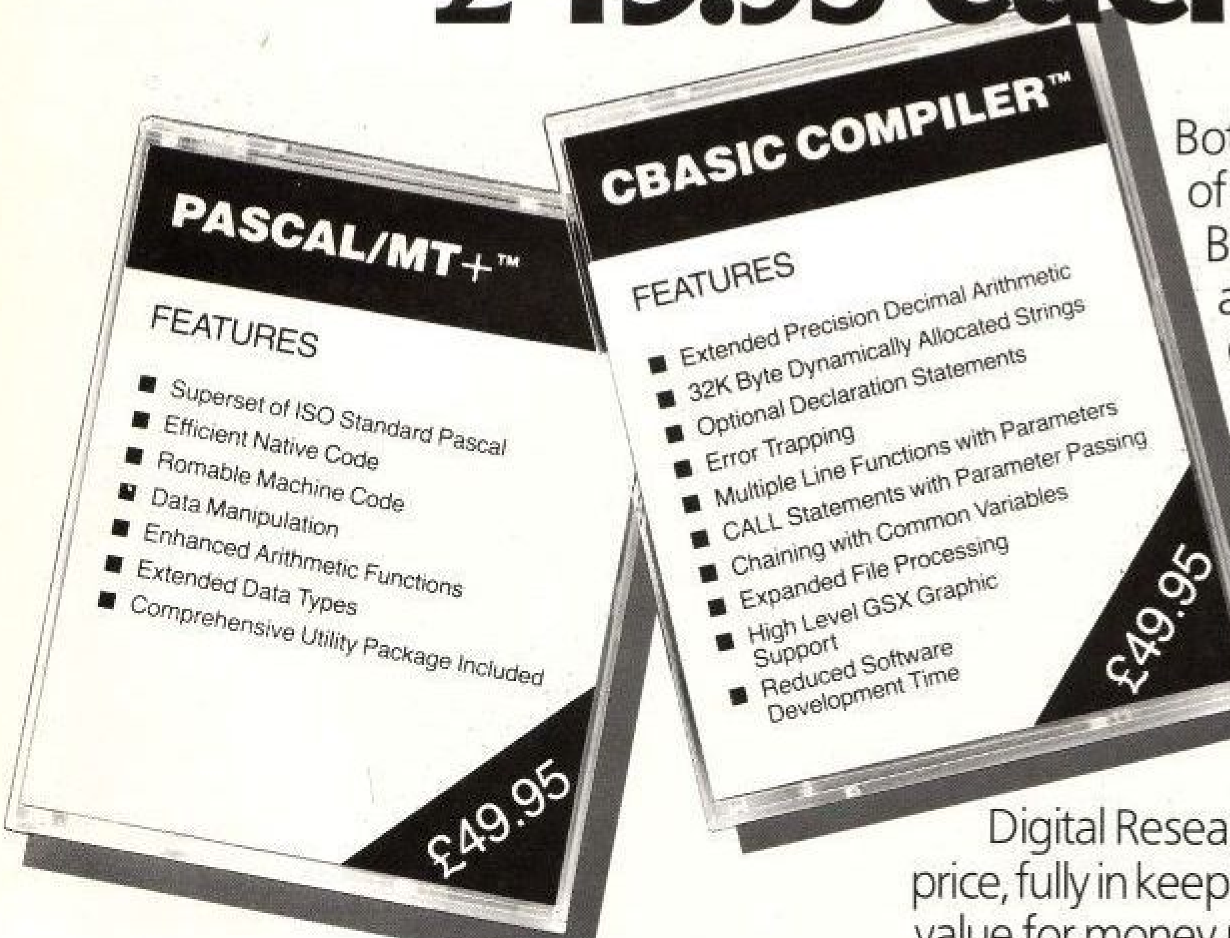
My children keep asking if they can play games on my new computer. Will the answer forever have to be, 'no, there aren't any to play!'.

Philip Moore,
Norwich.

ACU: The 8256 is a business machine therefore you are absolutely forbidden (under pain of being forced to read the Locoscript manual), to play games on it. Seriously though, there aren't too many games around. There are a number of text adventures that run under CP/M (see our review of Hitch Hikers on page 10), or you can buy some of the books that list Basic games. The Usbourne paperbacks which seem to be available everywhere have Basic listings for various machines. Most of these will be broadly compatible with Mallard Basic but you may have to make some minor changes to them. There are two other books, Basic Computer Games and More Basic Computer Games by David Ahl, that list games that should work with Mallard Basic. Oh, Amsoft do intend to release a 3D Chess, full report soon.

AMSTRAD PROFESSIONALS FROM DIGITAL RESEARCH

First, two powerful software development languages at just £49.95 each.



Both as complete packages of standard Amstrad 3" disks. Both configured to load and run **now** on your CP/M bundled Amstrad PCW 8256 or CPC 6128. Both offering you the applications portability and development power of professional CP/M programming languages from the creators of CP/M, Digital Research. Both at an extraordinary price, fully in keeping with Amstrad's own value for money philosophy. Both available for the first time directly to Amstrad users.

Amstrad Professionals from Digital Research will progressively expand the capabilities of your Amstrad by providing you with an armoury of professional languages, tools, utilities and graphics packages of unrivalled power and value for money in the small computer field. (See also DR GRAPH and DR DRAW overleaf, both released simultaneously with the above Amstrad Professionals titles.)

Full support available from BELL TECHNICAL SERVICES LTD

Start building your Amstrad armoury now with Amstrad Professionals from Digital Research.

Send your order and cheque or credit card number to:
DIGITAL RESEARCH (UK) LTD
Unit 12, Fenton Way
Southfields, Basildon
Essex SS15 6SL

Or contact your local Amstrad dealer.

DIGITAL RESEARCH®
The creators of CP/M™

Losers weepers

I write just after, yet again, I have run around the lower slimey maze, with pockets bursting with about £500 trying to think what I could do now.

Yes you got it, "Finders Keepers'!. What do you do now? I keep going around the rooms of this game with a tube of superglue stuck to me *(Sounds painful – Ed)* and a 'Spark of Life' in my hand and lots of money but I don't know what to do next. How do I get out rich? How do I get the presents to Her Highness? Please what do I do at this point of the game?

Grant Earnshaw,
Morcott, Leices.

Don't dump that program!

'Down in the Dumps' yet again! Yes yet another program that will not run on the CPC6128.

Attempts to load 'Dump Bin' listing 1 using program listing 2 merely produces the response 'syntax error in line 120'.

The program 'Screen Designer' listed in the CPC6128 User Instruction Manual will not run on the 6128 either, and that is written by David Radisic also.

I do hope someone has bought Mr David Radisic a 6128 for Christmas then we may look forward to some software that will run on this computer.

As yourselves, Amsoft and Amstrad have made it quite clear that you will not get involved in any correspondence concerning your products perhaps you will allow me to generate some 'self help' for 6128 owners.

CPC6128 owners! Have you had any first hand experience of commercial software that runs successfully on the 6128?

Would you like a complete list of all available software?

Drop me a line stating the type of software you have and the name of the software house who wrote it, in return I will provide you with a copy of the completed list of all the inputs I get with further updates as the known range increases.

T. Davies
West Midlands

ACU: We are sure David's program works on the 6128. The following letter is from a gentleman who has not only got the program working but also customised it for his own printer. In fact David has got a 6128.

. . . And

David Radisic's screen dump program is just what I have been waiting for. Imagine my disappointment when all I got was line feeds on my Shinwa CPA80 printer which I had thought was Epson compatible.

After disassembling the listing I found it sends ESC * m,n1,n2 to the printer to select a bit image mode, in this case mode 2, giving double speed double density, 960 dots per line.

The Shinwa does not support mode selection of bit image printing however ESC K n1,n2 selects double density bit image printing at 1280 dots per line.

The listing for the loader program should be changed as follows:

```
5410 FAC9212D82CD6B81,1100
5690 0E0F014000034C20,205
```

Hope this is of help, the picture is slightly smaller than an Epson print out, and don't forget to reset the printer line spacing after a dump.

Joe Jackson,
Bedhampton,
Havant, Hants.

ACU

REMs

Super . . er?

While extolling the benefits of the so called 'Classical Education' to my staff, (it's easy to spell long words eg supercede, as it derives from Latin, super cedo) I was pulled up short by the supersede pressure group. Further study revealed that it was the Ancient French who misspelt cedo, and thus gave us the technically incorrect supersede. Non-conformist purists may therefore still use supercede but it was the Fr***h who ****** it up. (A. Fisk, Wickford, Essex.)

***ACU:* By 'ancient' you mean anyone over twenty-two?**

Questions! Questions!

I like the questionnaire on page XIX (Dec issue) but have some criticisms. David Ward's article implies, without actually saying, that you would like readers to send them in. So onto my hobby horse.

Your contents page says, "no part of this publication may be reproduced without permission". There! I've done it already. If I fill in your questionnaire and send it in (a) I've spoilt the magazine (b) I might want to refer to the questions again – or the advert on the back. I'm not allowed to copy the questions. What do I do? (D.A. Rock, Liverpool.)

***ACU:* You have many sleepless nights worrying that we are going to sue you when we receive your photocopy. Seriously though, our warning is intended to stop people 'lifting' text directly from our pages. In one particular month we had three separate listings 'lifted' by rival magazines.**

Manual mauled

May I suggest a column for PCW8256 owners who would dearly love to be users, but who find themselves unable to follow the manual. I suspect that many PCW purchasers like myself, have no particular knowledge of programming or computer conventions and jargon, and find the manual both technically deficient and badly written. I cannot believe it makes commercial sense for any businessman to wrap his product in mystery. As we say: the product isn't as good as its advertising. (Iain Sutherland, Sutherland PR, Southampton.)

***ACU:* Are you trying to say that the Manuals are just a teensy weensy bit difficult to understand.**

Strange things in Sorcery

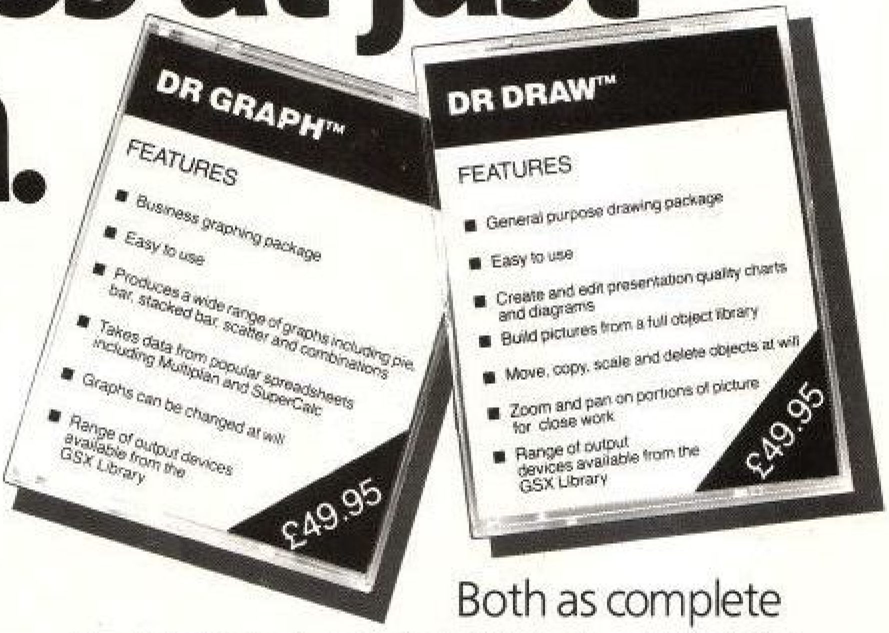
Have any of your readers who own Sorcery+, noticed while loading the game, that if they press certain keys, they get an advertisement for Strangeloop? If they have, and they know what keys to press to obtain this, please could they write in to the magazine? (Jason Anderson, 27 Greenwood Place.)

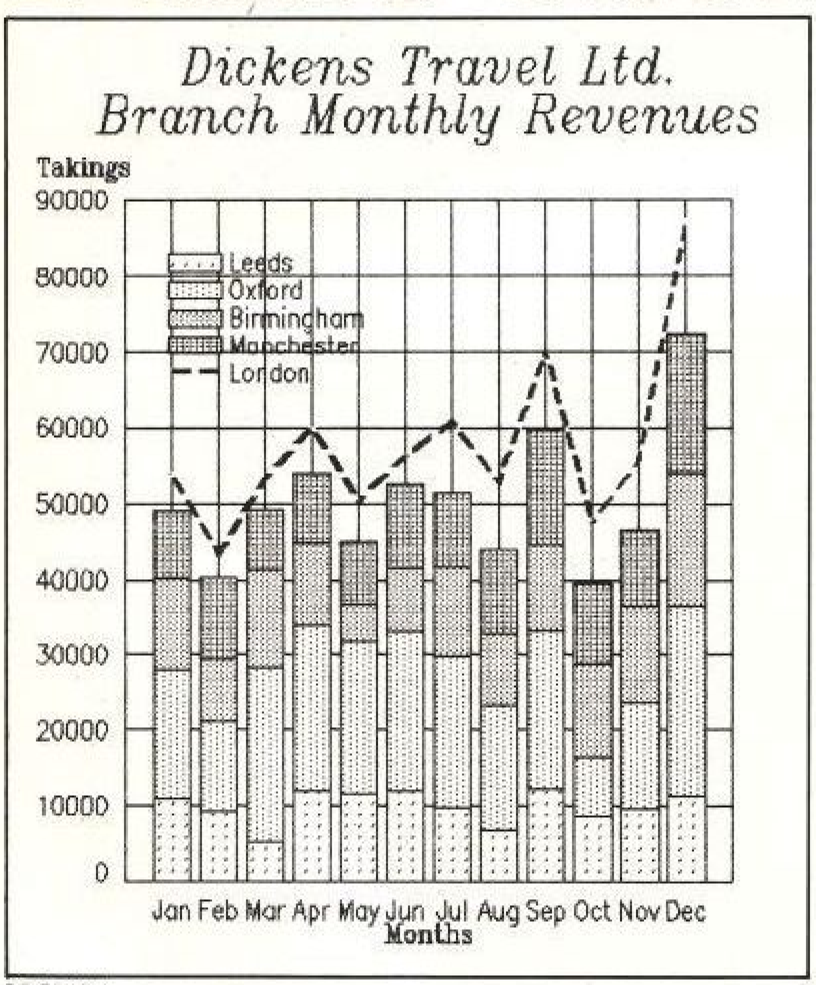
***ACU:* If you let the demo run its course the Strangeloop ad comes up eventually.**

REMs

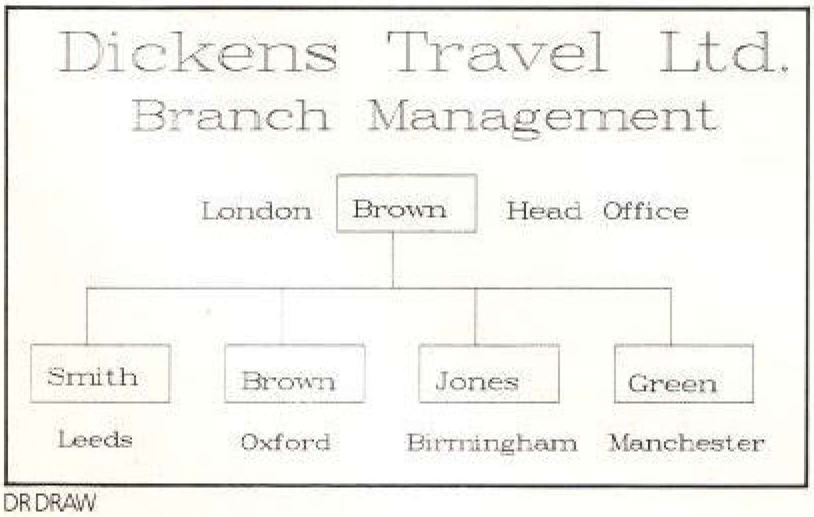
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Essex SS15 6SL
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SOFTWARE

GALLUP



This chart is based on the MicroScope chart as compiled by Gallup.

MicroScope GALLUP

MicroScope is the weekly trade paper of the microcomputer industry. If your computer store doesn't display the latest MicroScope chart, ask the manager to call Mark Salmon on 01-631 1433 – we'll send a copy every week.

	TITLE Publisher 4 weeks up to 16/1/86	Last Month			Months in chart	Market Strength
1	**THEY SOLD A MILLION** Hit Squad	1	-		2	100
2	**YIE AR KUNG FU** Imagine	2	-		2	84
3	**GRAND PRIX 3D** Amsoft	3	-	A 664 D	3	63
4	**FORMULA ONE SIMULATOR** Mastertronic	5	▲	???	3	54
5	**SOUL OF A ROBOT** Mastertronic	6	▲	664	3	53
6	**FINDERS KEEPERS** Mastertronic	4	▼	664	6	50
7	**COMPUTER HITS (10)** Beau Jolly	12	▲	???	2	48
8	**CAVES OF DOOM** Mastertronic	13	▲	???	2	39
9	**SCRABBLE** Leisure Genius	14	▲	664 D	5	29
10	**WAY OF THE EXPLODING FIST** Melbourne House	10	-	664	6	28
11	**CHILLER** Mastertronic	9	▼	664	6	28
12	**NONTERRAQUEOUS** Mastertronic	7	▼	664	6	26
13	**RAID!!** US Gold	8	▼	A 664 D	3	24
14	**WHO DARES WINS 2** Alligata	ne	▲	???	1	21
15	**GYROSCOPE** Melbourne House	ne	▲	???	1	18
16	**SPITFIRE 40** Mirrorsoft	ne	▲	A 664 D	1	17
17	**BRUCE LEE** Datasoft/US Gold	ne	▲	664	1	17
18	**COMPUTER HITS (6)** Beau Jolly	ne	▲	???	1	16
19	**SPELLBOUND** Mastertronic	ne	▲	???	1	16
20	**HIGHWAY ENCOUNTER** Vortex	re	▲	664	3	15

D Available on Disc — 664 CPC 664/6128 Compatible — A Available from Amsoft — ??? Untested

SOFTWARE CHART

GAME OF THE MONTH

Hitch-hiker's guide to the Galaxy


© BBC Enterprises

Way back in the late Seventies only a few people knew who Zaphod Beeblebrox was, what use a Babel Fish is, the significance of owning a towel and the fundamentals of improbability physics. The Hitchhikers Guide to The Galaxy has outgrown its status as a cult radio series, progressing into print and onto TV. The latest step has been to bring Hitchhikers onto the computer.

The Hitchhikers Guide has been brought out as an adventure game by Infocom. Infocom are not well known in Britain but are a famous American software house with many years experience writing adventure games. Their previous titles have included the Zork series of adventures and have all been written for computers running operating systems such as CP/M. This is the reason that Infocom are not well known in Britain as there have been few people until now who have had access to a suitable computer to run the games. Now, (thanks to Amstrad) CP/M has blossomed in Britain, many people are able to appreciate these outstanding games. Douglas Adams (who incidently, like all the best writers, comes from Brentwood) is the author of Hitchhikers. The story behind his working with Infocom (based in sunny California) must be an interesting one.

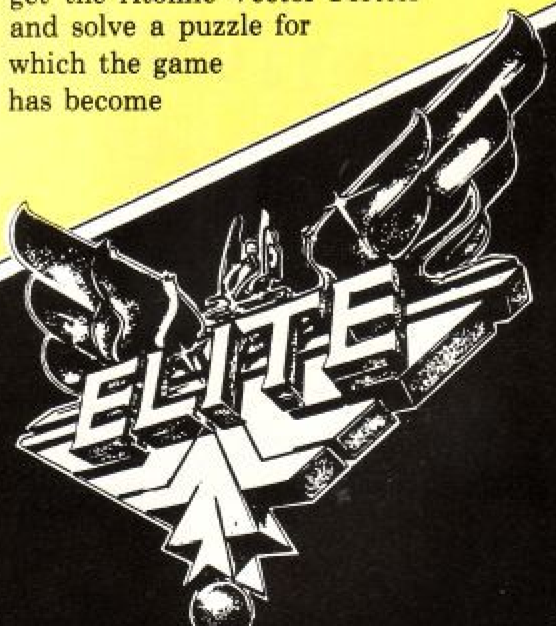
Life, don't talk to me about life

The game follows the Hitchhiker story fairly closely. You start as Arthur Dent an ordinary Earthling, at the start of a perfectly ordinary Thursday. The text on screen (no graphics or sound in a CP/M environment) tells you that it is dark. This is your first challenge. What must be done to progress further into the game? I'll give you a subtle clue, Switch on the light. What? I've spoiled the entire game for you? Rubbish! Anyone could work that out. The game progresses through Arthur's morning. A bulldozer arrives unexpectedly on his doorstep. Unexpected due to a foul-up in the local council planning office which should have sent Arthur notice about his house being demolished. There is a similar thing happening to the whole of Earth at that very moment.

The problem in the initial part of the game is to prevent the house being demolished while Arthur is around. If this happens a stray brick will undoubtedly end the game for you. You will soon meet Ford Prefect, your travelling companion. He is one of several characters you will meet in the adventure. Each of these characters can be spoken to, with varying success. The man who has been sent to demolish your house is a Mr Prosser, try asking him what the time is. The game is really for true Hitchhikers fans, the sort of person who knows what flavour Roosta's towel is. The person in the office who had only read one book gave up much sooner than anyone else.

If you play the game properly, you will end up in the pub supping beer with Ford Prefect. It is at this point that Ford reveals that he is from the planet Beatleguse 5, and not from Guildford after all. There is more to the pub than meets the eye, a good adventurer will examine it carefully and try spending some money, he will not drink too much. Hitchhikers goes in for some joke items, but these all appear late in the game. To start with keep your wits about you. Everything has a purpose.

You cannot prevent your house being destroyed. If you did you would be vaporised, along with the other denziens of Little Cottington, when the Earth is demolished by the Vogons – The meanest, most awkward race in the Galaxy. "The best way to get a drink out of a Vogon is to stick your finger down his throat". You can avoid the problem by getting a lift to Barnards Star from the great yellow ships that hang in the sky – much the way that bricks don't. Unfortunately for you reaching Barnards Star is about as likely as screaming Lord Sutch becomming the next Prime Minister. You will be thrown out of the ship whatever you do. First you must get the Atomic Vector Plotter and solve a puzzle for which the game has become



A long time ago, in a University far, far away there were two programmers, Ian Bell and David Braben. They spent three years writing a computer program which impressed the most cynical programmers, a game which shoot-em-up freaks loved and which even had the most straight-laced of chartered accountants burning the midnight oil.

Elite was originally written on the BBC, a computer renowned for its speed and infamous for its lack of memory. Before the program's release a programmer from Acornsoft said "I shouldn't tell you anything about it, but you look at the program and say 'That can't be done', but it has". Elite made its way to the Amstrad from the Spectrum, converted by a pair of Scottish programmers who call themselves "Torus".

Having to wait for programs to be converted is an annoyance that Amstrad users are learning to live with. There is a little compensation when the program has improved as the programmers go back to the job. Amstrad Elite is the newest and arguably the best version of the program. It certainly has the best explosions.

The Scenario

Elite is both a shoot-em-up and a trading game. You play the part of a spacetrader, sailing through the spacelanes, buying and selling commodities. Throughout the game you fly a Cobra Mk III spaceship, a one-man

Zaphod Beeblebrox, Ford Prefect, Trillian and Arthur Dent.

famous – how do you get the Babel fish. For this you must have one of the most innocuous objects you came across at home. If you can manage this getting the plotter should be a doddle.

The game then gets harder, you have to build an Infinite Improbability drive, argue with the most obstinate of doors and survive without any tea. In your travels you move through time and space and take on the roles of several different characters. After all some of your movements are infinitely improbable. Infocom have some much harder adventures, solving those must be impossible. Infocom have developed an excellent parser, the result of many years development. It will allow an exchange like this:

Drop fluff
Which fluff? satchel fluff or pocket fluff

all
Satchel fluff dropped
Pocket fluff dropped

You need to experiment a bit to find out what you can do but it is important to learn to examine everything. If you get stuck there is a copy of the guide which you can refer to by typing:

Consult guide about vogons

or whatever you are having trouble with. A third, mostly useless source of information is the collection of footnotes. These are very funny, even if they do choose some very inopportune moments to crop up.

As a package *The Hitchhikers Guide to the Galaxy* is an excellent buy, even at £24.95. It will work on any Amstrad disc system – even the PCW 8256. If you get really stuck you can buy a special hint book, called Invisiclues, which will help you with problems like how to get the flowerpot out of the whale and how to get onto a planet surface from the Heart of Gold. If you are a Hitchhikers fan, even if you find adventures the most boring thing on (or off) Earth you should buy it. Hitchhikers is pure Douglas Adams genius.

vessel capable of outrunning all but the fastest of the other ships you may meet and with a carrying capacity of 20 tons.

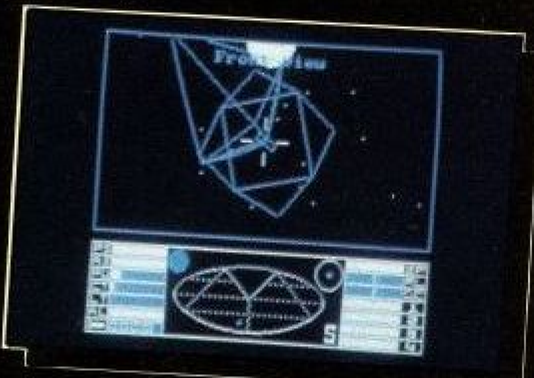
The aim of the game is to reach Elite status. Your rating reflects how many other ships you have shot down. If you attempt this with a poorly equipped ship you are not going to last very long. Your first task is to raise some money by trading. Once you have made the money you can pitch yourself into battle.

There are a couple of tools to help you earn more and faster. A fuel scoop will pick up any flying debris, including cargo ejected by exploding victims. The scoop's main use is to collect fuel by skimming the surface of a sun. An extra cargo bay adds another 15 tons of carrying capacity and speeds the road to riches. Once you are suitably wealthy you can start buying some weaponry.

Space is a dangerous place. You start the game with a front mounted pulse laser and three missiles. Your armoury can be increased by adding more powerful weapons to the front, back and sides of the craft. You can carry a fourth missile and an energy bomb, capable of destroying all the craft within the vicinity. Missiles are easily targetted on a foe and then home automatically. They are not infallible, and can be destroyed by a ship armed with electronic counter measures.

As other ships shoot at you your energy banks are slowly depleted. It is possible to improve this situation by buying an energy unit. This tops up the shields. The manual reminds you that the special energy unit has a copper coloured top and that no other energy unit looks like it or lasts like it, a feature which sounds pretty terrestrial to me.

Your foes range from simple, slow craft like the Kraits to the fast and deadly Vipers and Fer-de-lance. Vipers are police ships. They will come after you if you should carry contraband in the form of firearms, narcotics or slaves. You need to be an excellent shot to out-gun them and very stupid to pick a fight.



The Thargoids are among the slowest of the enemy ships but they are certainly the most deadly. They are an evil alien race who have had their fear glands surgically removed. The ships release Tharglets, small remote controlled ships which home in and attack you. The best way to deal with a Thargoid is to run away, very fast, Hyperspace if necessary. Once you have destroyed a Thargoid all the little Tharglets lie idle and make rich pickings. They can even be scooped up for bounty.

Elite comes with a book by Robert Holstock. Called "The Dark Wheel" it is fun to read in its own right. I read it on the train into work before I had played Elite. It captures the atmosphere magnificently and teaches you a lot of the tactics for the game.

One of the important hints it gives is never sell goods at a loss and never make a journey with an empty cargo bay. Every product has a different value in a different place. It is learning where to buy and where to sell that is the key to the game.

You can call up a record of the industrial nature and politics of each planet. This gives an indication of the best cargo to carry. Detailed market prices are not available outside the hyperspace range of a planet, so it is worth making notes as you go along.

Getting from planet to planet means going through hyperspace. You must buy enough fuel for each journey. Hyperspace does not take you straight to a planet, it only takes you within easy range. You must fly from the re-entry point to a space station orbiting the planet and dock.

Docking is perhaps the most important skill to master. "The Dark Wheel" gives the impression that only cissies use a docking computer but running into a spacestation is a mistake you only make once in a lifetime. Muck up docking and it's back to the start or a saved game for Commander Jameson. A docking computer takes all the effort (and skill) out of getting goods into a spacestation. You still have to fight off all-comers to get to the spacestation but that is how you win your wings.

For the rookie pilot a useful tip is to notice that the door to a 'station always points towards the planet, so if you fly to the spacestation then dive towards the planet for a short while you should have the door behind you, turn around and steer straight in.

Elite is a wonderfully addictive game. The graphics may be smoother in Starion, the trading may not be as detailed as some strategy games but the end result is wonderful. ACU

Some of the features of the new Mini Office II

With the word processor you can . . .
★ Select most features by menu or embedded commands. ★ Transfer records from database for personalised circulars. ★ Choose from three methods of display: 20 column (double size characters), 40 column, 80 column. ★ Centre, indent, tab, justify and merge text. ★ Insert, copy, move or delete blocks of text. ★ Select two editing modes: insert or overwrite. ★ Search and replace globally or selectively. ☆ Check typing speed in words per minute. ☆ See on-screen real-time clock, plus word and character count.

With the database you can . . .
★ Select five field types (Alpha, Decimal, Date, Integer, Formula). ★ Perform all arithmetic functions. ★ Search over multiple fields. ★ Mark individual records. ★ Use flexible printout routine. ★ Pass records to the word processor. ☆ Carry out powerful multi-field record sorting.

With the spreadsheet you can . . .
★ Total rows and columns, with easy selection of criteria. ★ Copy formulae either absolutely or relatively. ★ Print out all or part of the spreadsheet. ★ Move directly to a specific location. ★ Select movement of cursor. ☆ Recalculate automatically or manually.

With the label printer you can . . .
★ Design any style of label with the versatile editor. ★ Select label size and sheet format. ★ Read directly from database files.

With the graphics pack you can . . .
★ Enter data directly or take from spreadsheet. ★ Use icon type menus. ☆ Choose pie chart, bar chart or line graph. ★ Display up to three line graphs simultaneously. ★ Display up to three bar charts side by side or stacked. ★ Choose bar charts in either 2D or 3D. ★ Draw compacted or emphasised pie charts. ★ Define your own style of shading. ★ Dump graphs directly to Amstrad or Epson compatible printer.

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It's MINI OFFICE II on the Amstrad 464, 664 and 6128

Software



It's a graphics pack . . .



It's a comms pack . . .

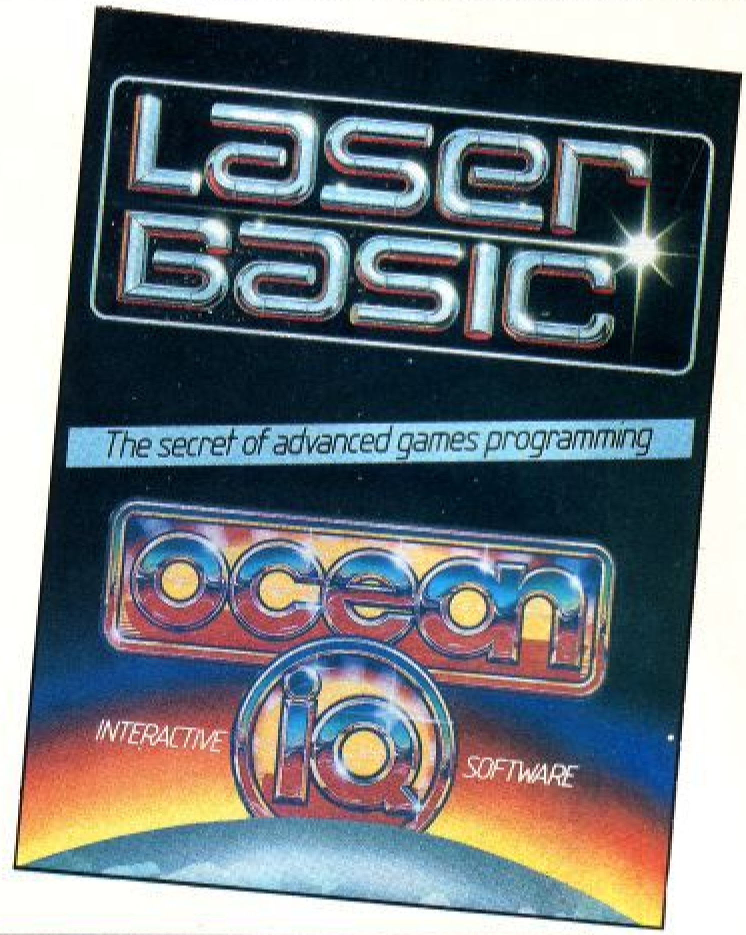


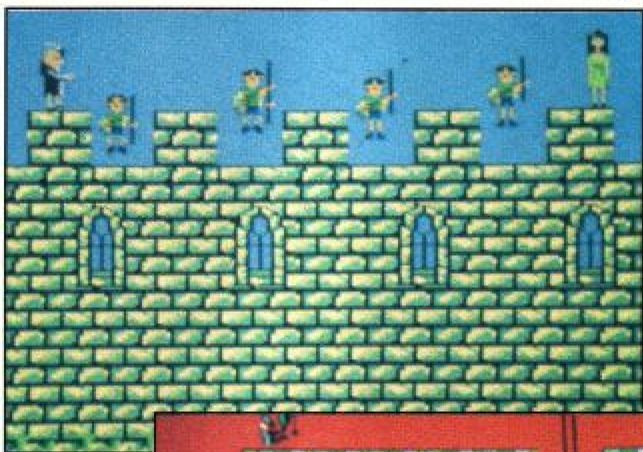
It's a label printer . . .

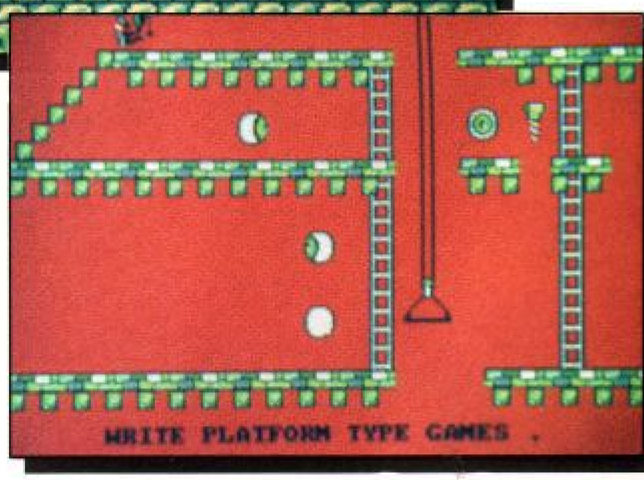


All 6 modules for £14.95 (cassette), £19.95 (3" disc)

GAMES AT THE SPEED OF LIGHT







Chris Wood looks at an aid to programming from Ocean IQ

Let me start by saying that Laser Basic is not just 'a', but *the* games writing utility on the market. Published and marketed by Ocean it is written by the Oasis software house, who are famous for their Forth based utility 'White Lightning' which appeared on the Spectrum and the CBM64. They are sure to become more famous with this program. There is a Basic compiler in the offing, which will enable your Laser Basic programs – and presumably your normal ones – to run even faster than they do now, and Amstrad Basic is not particularly slow at the present.

Well, what do you get for your money? A huge video case sized box with two cassettes containing no fewer than twenty six between them. These are not all programs, and include several banks of sprites, showing the extent of the effort put into the package by the programmers. Of course, if you coughed up the extra few pounds you get a disc with the programs on. You also get a 128 page manual which details and explains the 200 or so commands. Although the box only says 464/664 the manual says 464/664/6128 and this is indeed correct, I suppose the box covers were designed before the 6128 was around, and it shows how long Oasis have been working on this project.

The best advertisement for the program is in the sample demo which must run for some five to ten minutes, and really shows off the program – and the Amstrad. I was particularly impressed by the opening tune that plays while a message to 'Press a key' scrolled smoothly across the bottom of the loading screen. I never knew the Amstrad could make such sounds. Indeed all the tunes show off the sound capabilities very well, and it is good to see this department has not been skimped, as it so easily could have been.

Although Laser Basic is designed mainly to enable you to write platform games, this is not as limiting as it sounds. Platform games come in all shapes and sizes, and it is just as easy to write a shoot-em-up with Laser Basic. The platform game, being the most common format, has been used as the basis for most of the examples. Laser Basic is capable of doing whatever most sprite based games do.

There are around 200 commands, divided up into eleven classes. Some classes do not have certain features available to other classes. This is sometimes because of the nature of the command – for instance, you would not need a FILL routine to run under interrupt – and sometimes for speed, for instance you would not need the collision detection on all your sprites in a game.

If you designed your game so that none of the 'bad guy' sprites passed in front of anything, but your 'good guy'

sprite was free to roam at will, then you only need to have the 'bad guys' checking if they hit anything, and if they do it can only be you that they have hit. This is a method used in many games, Jet Set Willy to name just one. Some of the classes of command will also not work in mode 2 (80 column mode) such as the command to print in front or behind something that is already on the screen. This is because in mode 2 there are not enough colours to show a difference, although these commands are very effective in the other two modes.

Sprite control

You can enlarge, flip and mirror your sprites, you can define a window on the screen and set them bouncing around inside it, in fact several windows and several sprites, animating as they do so. You can even define a window *inside* a sprite and get the window to scroll/mirror/flip/enlarge. Have you seen those games with little space-ship sprites with rotating bands of coloured lights? Define a thin window inside a suitably designed sprite and set it scrolling with 'Wraparound' i.e. what goes off one side comes on the other, and Bob's your uncle.

Sprites can be run under interrupt, and you can pass whole strings of commands to them and they will happily run along, bouncing about in their windows or rotating on the spot or whatever you have set them to do. Tracking sprites can be very powerful. They are dummy sprites which can contain mini programs which relate to other sprites.

There is also the very useful BILD instruction which is used for storing compacted screen data. It works by scanning through the data in one sprite which contains the shape of the screen. For every bit in the byte that is set it will print the second sprite in the appropriate place on the screen. Rather like a character designer, where you have a small version of the character and a large version of the character to work on, instead of just having a larger version of the character you could have it made of bricks, or stripy, and you could of course have any shape you wanted. If your screen layout wants to be more than eight blocks wide (the number of bits in a byte) you simply move the point that you start the BILDing from and expand the data from another sprite. In this way you can have very complex screen layouts in incredibly small amounts of memory.

The sprites also have very sophisticated collision detection and pattern recognition. If you place a platform game type 'object' in front of a piece of background, it is still possible to pick out the shape of the object and recognise it, and sprites can check collisions with other sprites in the same way. All the collision detection is pixel perfect, none of this dying-before-the-monster-is-anywhere-near-you stuff. Although it would have been nice to have a simpler form of collision detection in case you want to do a shoot-em-up type game where pixel accuracy is not too important.

Mini Basic

There are just so many commands that it is impossible to list all their virtues, and I am sure that you would be hard pushed to find something that cannot be done with Laser Basic, in fact there are plans to publish a Mini Laser Basic which will only contain the most often used commands, and dispense with ones such as FILL which you would only use in designing a sprite or title screen, and ADDR which will give you the actual address of a command should you wish to put it in a tracking sprite or call the command from machine code – once you have got the address you don't need the command again. This Mini Basic will leave you more room to write your programs in, and when the compiler becomes available (soon) it will be very easy to write commercial quality software. One other thing that has been done to allow you the maximum memory available for your programs is for the data and programs to load without using a buffer. Programs don't need a buffer for them to load into before they are put in the right place in memory. This gives you an extra 4k to write in.

Amongst all the other files on the tapes (or disc) is one called SPTGEN which allows you to design your sprites. Because it is run with the Laser Basic machine code in memory, there is virtually nothing you can't do to your sprites, flip them, mirror them, stretch them, rotate them etc. Powerful though it is, the designer is not easy to use at first. The key choices seem a little awkward, but as it is written in Basic you can change them yourself.

The most limiting thing is that you design your sprites one character square at a time i.e. eight by eight pixels and then place them onto a workspace below the design area, to build up your sprite. It is a little like making a mosaic, and it is not easy to see whether one of your blocks will line up with what is already on the workspace until you put it there, so you would be well advised to at least design a rough sketch on some graph paper before starting work. When you have finished designing your sprite, you stretch a window around it and then lift the window containing your sprite off into memory, so it is easy to change the size of your sprites, as you just put them back on the workspace, add or erase bits from them, and then stretch a new sized window around them and store it away.

The Animation part of the program – where you get to see if the frames you designed for your 'space creature' means he walks with a limp – was also a little unfriendly in that your creation would only animate at one speed, and that was too fast to really see if the frames of animation matched up. Again this could be easily changed by altering the Basic program, but it shouldn't really be necessary.

The last program is a sound generator, and because of the infinite variety of parameters that you can pass to the Amstrad's sound chip, is not at first easy to use. With all the juggling of Tone and Amplitude Envelope parameters, and deciding whether channels should rendezvous, hold, or flush, you should first look at the examples of two of the tunes that are listed in the manual, with all the data for the three channels, so you can play with them in order to see what can be achieved. I must admit sound is not my strong point, but the four multi-voice tunes that play during the demo show just what can be done with a bit of perseverance.

If you want to write a game, and don't have the expertise to write the machine code sprite handling, with the collision detection etc. or you just don't see the point in re-inventing the wheel and writing your own, then I would say go out and buy Laser Basic. Ask your local shop to run the demo. You won't walk out of the shop without a copy after seeing it. ACU

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"PSS have every right to be proud of this game ... it is very good indeed and I would recommend it to any wargamer." *(Amtix 12/85)* *"Well presented with clear, concise instructions ... a game that will make your head hurt and your hands sweat."* *(Popular Computing Weekly 11/85)* Great new wargame with training option (one day's fighting only), Blitzkrieg option, and full 30-day campaign. All with or without arcade battle sequences. (PSS) Sticks OK. **AMSTRAD 464/664/6128 Cassette £9.95 Disk £12.95**

LASER BASIC

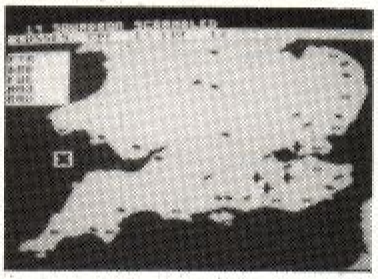
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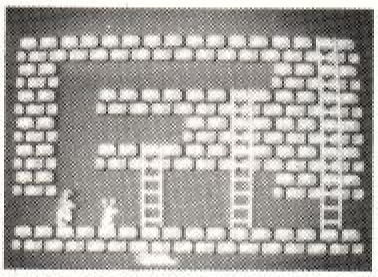
"One of the most advanced, original and involving text adventures you'll ever play ... a sophisticated text adventure without peer in terms of scope, imagination and involvement." *(Popular Computing Weekly 12/85)* The long-awaited first part of the 'Lord of the Rings' trilogy. 530-page paperback 'The Fellowship of the Ring', 2 double-sided cassettes for 2-part adventure, 30-page manual. Special BEGINNER'S LEVEL version of the first adventure included. Vocabulary over 800 words! A classic. (Melbourne House) **AMSTRAD 464/664/6128 Cassette £15.95**

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"ELITE without the vector graphics, but with a lot more trading." *(Amstrad Action 01/86)* Realtime space adventure/trading game. 3 play levels. Each new game has a new universe with 1,002 planets, 60 space stations, 62 black holes and 18 galaxy hypergates. 11 galaxies in each universe, each galaxy with a play area of 600 cells. A great big game with good graphics. Simple to understand, fun to play. Sticks OK. (Amsoft) **AMSTRAD 464/664/6128 Cassette £9.95 Disk £13.95**



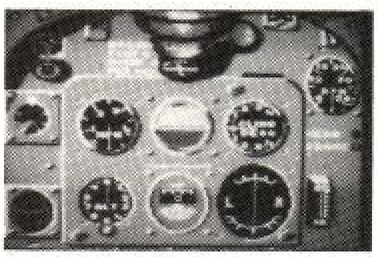
Battle of Britain



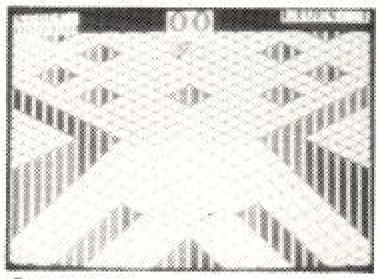
Laser Basic



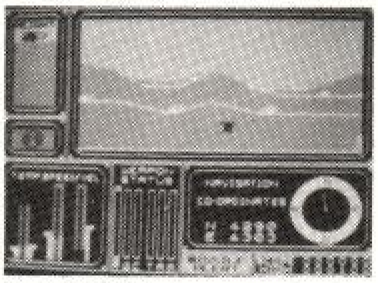
Macrocosnica



Spitfire 40



Gyroscope



Combat Lynx

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"Lets you fly the classic warplane in both training flights and full combat. The game is marked by extraordinary detailed graphics." *(Popular Computing Weekly 12/85)* You are 19, training to fly your Spitfire in 1940. Learn quickly, you're needed in combat. 5 skill levels. 3 different pilots for each level, each offering practice, combat practice and full combat. (Mirrorsoft) Sticks OK. **AMSTRAD 464/664/6128 £Cassette £9.95**

SWEEVO'S WORLD

"The game is full of dreadful visual puns and jokes and should prove as funny to play as it is difficult to finish." *(Sinclair User 01/86)* Ultimate-style superbly graphic adventure, but with jokes and four different levels to explore. Great tunes, too. Highly recommended to arcade/adventure fans with a sense of humour. (Gargoyle) Sticks OK. **AMSTRAD 464/664/6128 Cassette £7.95**

GYROSCOPE

"It's a brilliant game ... the graphics are excellent ... this is one of the most addictive games I've played." *(Crash! 12/85)* *"Looks exactly like 'Marble Madness' with those 3D geometric landscapes full of lumps and dips, sudden falls and gaping chasms ... horribly addictive and technically very clever."* *(Popular Computing Weekly 11/85)* Sticks OK. (Melbourne House) **AMSTRAD 464 NOT 664/6128 Cassette £8.95**

QUIZ QUEST

"It's neatly presented and easy to use and, best of all, the questions seem to have been set at the right level for averagely well-informed British adults ... as quiz programs go, this is one of the best." *(Popular Computing Weekly 12/85)* It's a fun family game and it's possible to create your own files of questions, in addition to the questions all ready for you to use. (Alligata might even publish yours.) Sticks OK. (Alligata) **AMSTRAD 464/664/6128 Cassette £5.00 Disk £12.95**

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A HANDS-ON EXPERIENCE WITH JOYCE

In part two of his series, Mike Gerrard describes the Locoscript word processor on the PCW8256

Last month we looked at the hardware and non-LocoScript software provided with the Amstrad PCW8256. This month we'll go on to take a lengthier look at the word-processing program that's an integral part of the machine, LocoScript. The vast majority of PCW purchasers are going to be working with this program every day, and it's important to realise straight from the start that no matter how good the hardware is – and the PCW certainly does its job there – it's vital you have a good word-processing program that allows you to do exactly what you want to do.

Because of the nature and price of the Joyce, it's probably safe to assume that most purchasers or would-be purchasers are new to micros and to word-processing. That's certainly the case among the people I know who have bought or are thinking about buying the machine. Most people know about the concept of word-processing, without fully understanding the problems involved. Just as you couldn't expect to run the company accounts of ICI on a Spectrum, so you wouldn't expect to do any serious word-processing using a tape-based program that costs you a fiver. Although that's an extreme example, you will still find that within the range of more expensive and fairly comprehensive word-processing programs available, you could still choose the one that won't allow you to do the things that are most vital to you.

Before looking at the way you prepare and edit documents using LocoScript, it's worth knowing how the program communicates with the printer, which is unusual because of the integrated nature of the whole Joyce package. If you've seen most printers, you'll know that they contain various switches allowing you to set them to do different things. The Amstrad printer has none of these. The instructions you must give it must come from the keyboard.

The starting point for LocoScript is always the disc management screen, the screen that comes up a few seconds after loading the disc. This displays the disc directory, listing all the files (documents) that are on the disc in the drive, as well as those on the RAM disc, and it also contains space for the directory of the optional second disc drive. This screen, like all the others, also tells you the options you have at that point, and as far as control of the printer is concerned there are three things you can do. First is simply to press P to Print a copy of a document, in which case the printer will, without further ado, get on with running you off a copy of the document currently highlighted by the cursor. If you press D for Direct Printing, the screen will change and allow you to type in a line at a time, this being printed when you get to the end and press RETURN. This is useful for adding post-scripts or putting addresses on labels. Even in Direct Printing mode you can still make use of the text layout commands such as centering or right justification.

Third option is to press the special PTR key (which can also be used to halt printing in mid-document). This simply allows you to choose from the printer's various options, such as draft or high quality (near-letter-quality) print-out, single sheet or continuous stationery, resetting the printer and so on. It's worth mentioning these printer options first because you ought to get into the habit of checking them before printing out a document. Though all other commands are embedded in the document itself, for layout, style, emphasis and so forth, you can't also enter an instruction to say that it will only be printed out in draft quality – that has to be set before printing begins.

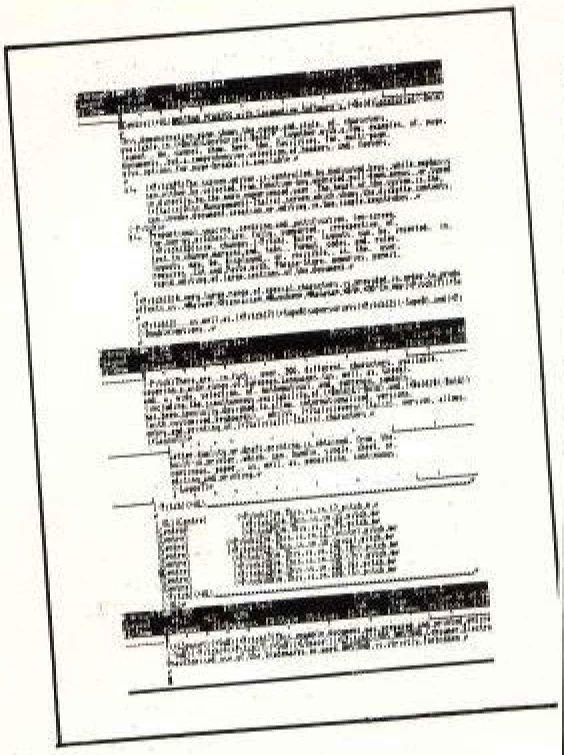
Back on the disc management screen, let's begin not as the manual does with a disc full of sample documents, but with a blank disc, having loaded LocoScript in first. There will be an empty directory for Drive A and for Drive M. Newcomers will need a slight digression to explain what Drive M is. This is the RAM disc referred to above, which you can regard as a second disc drive of a temporary nature making use of some of the computer's own 256K of memory. You can put information on it and retrieve it again (as with a physical disc) but the data is retained only until you reset or switch the computer off, then it disappears. There are exceptions (aren't there always) but for safety's sake regard data in Drive M as temporary only, and use the drive mainly for transferring files from one disc to another.

File groups

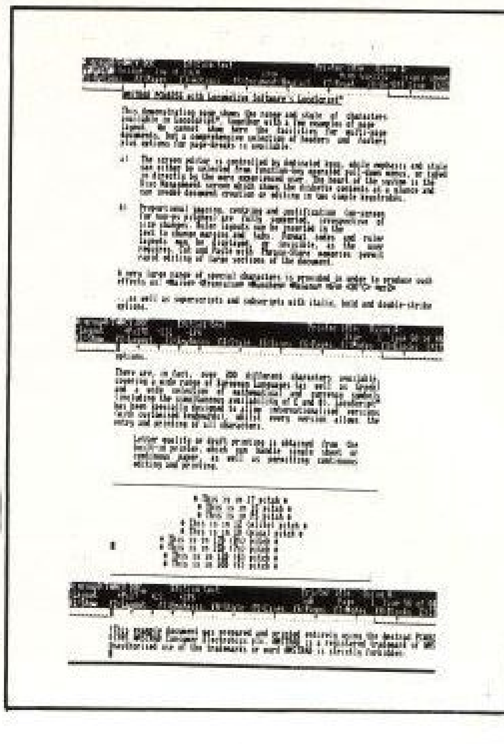
Back at our blank disc, the directory for a drive will show at the top the amount of memory still available and the number of files that are on that disc. Beneath that are eight groups, numbered in typical computer fashion from zero to seven. This grouping is a rare and welcome feature for a word-processing program, allowing you to keep similar files together. You might label the first group Letters, for example, the second group Invoices, the third Notes, the fourth Articles, and so on, according to your needs. This isn't just a case of neatness, however. The system does serve a practical purpose. Within each group, the first file you ought to create is one labelled Template.std. Don't worry about the layout of the labelling, what you need to know is that this template file contains the information which you yourself want to apply to all the files within that group. In the letters file, for instance, your template can contain your phone number at top left, your address at top right, with space for the addressee and the date beneath.

I have a separate disc for Amstrad User and my template for the Letters group already contains the editor's name and address, and the start of the letter, "Dear Simon,,". Each time I want to write, all that information is printed on the screen by simply pressing C to Create a new file, and all I need to change is the date.

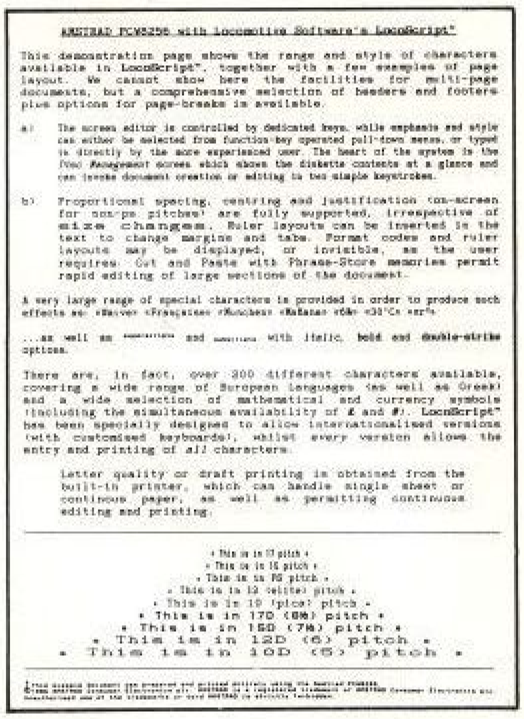
The reason why the template should be your first file



An article as it would appear on the screen with all the "show" options on...



... with all the options off...



AMSTRAD PCW8256 with Locomotive Software's LocoScript™

This demonstration page shows the range and style of characters available in LocoScript™, together with a few examples of page layout. We cannot show here the facilities for multi-page documents, but a comprehensive selection of headers and footers plus options for page-breaks is available.

a) The screen editor is controlled by dedicated keys, while emphasis and style can either be selected from function-key operated pull-down menus, or typed in directly by the more experienced user. The heart of the system is the Disc Management screen which shows the diskette contents at a glance and can invoke document creation or editing in two simple keystrokes.

b) Proportional spacing, centring and justification (on-screen for non-ps pitches) are fully supported, irrespective of size changes. Ruler layouts can be inserted in the text to change margins and tabs. Format codes and ruler layouts may be displayed, or invisible, as the user requires. Cut and Paste with Phrase-Store memories permit rapid editing of large sections of the document.

A very large range of special characters is provided in order to produce such effects as:

...as well as superscripts and subscripts with italic, bold and double-strike options.

There are, in fact, over 300 different characters available, covering a wide range of European languages (as well as Greek) and a wide selection of mathematical and currency symbols (including the simultaneous availability of £ and #). LocoScript™ has been specially designed to allow internationalised versions (with customised keyboards), whilst every version allows the entry and printing of all characters.

Letter quality or draft printing is obtained from the built-in printer, which can handle single sheet or continuous paper, as well as permitting continuous editing and printing.

• This is in 17 pitch •
• This is in 15 pitch •
• This is in PS pitch •
• This is in 12 (elite) pitch •
• This is in 10 (pica) pitch •
• This is in 17D (8½) pitch •
• This is in 15D (7½) pitch •
• This is in 12D (6) pitch •
• This is in 10D (5) pitch •

and the final document as printed

is because the program has to have a template to work from, and if there isn't one in that group then it will borrow the nearest available one from another group, which may take a lot of amending before you can create a different kind of document. Not only does a template contain the standard layout of text for a letter or invoice, say, it will also contain information from menus deeper within LocoScript which set line spacing, tabs, decimal tabs, italics, justification, line pitch and many more options, so it's possible for things to get very confusing when you come to print a document out and it looks nothing like you'd expected.

Having named your disc, named your group, and designed a template (which you'll probably want to refine later, but that's easily done), you will then either press C for Create a new file or E for Edit a file that already exists, and this is where we're getting to the heart of LocoScript. If you spend, say, 10% of your time designing layouts, moving files, formatting discs etc, then that's a generous estimate. The bulk of your time will be writing and editing words on the screen and in this respect LocoScript features fairly comprehensive editing facilities.

Moving around

If you believe in the simple approach then you can move the cursor around a document just by using the cursor control keys, and if you combine this with the Shift key the cursor will jump about 20 lines up and down or 20 characters left or right. But the keyboard also features special keys for moving the cursor around, and again this is not the normal word-processor approach, most systems needing you to remember which function keys or which combination of keys performs which task. With LocoScript, if you want to use the cursor to the start of the next line you press the Line key, or if to the start of the next paragraph then you use the Para key, or the Doc key to get to the end of the document. Keys pressed normally will always move you forward, while press the same key and Alt (one of Joyce's additional Shift keys) and you get the same result but moving back through the document, i.e. Alt and Doc will take you to the start of the document. There are also keys to move the cursor back or forward through one character, one word, one page, to the end of the line or to a specific point in the document which you can set by using the Unit key – this puts a code in the document and pressing the Unit key will automatically move the cursor to that code.

So getting where you want to go is fine, and text is added simply by starting to type what it is that you want to insert, though I do miss the Commodore 64's facility to actually type over something and automatically remove the original text as you go. In common with many other machines and word processors, though, Joyce simply adds in text, leaving it to you to remove unwanted material. This is easily done, there being two Del keys, one deleting the character under the cursor, the other deleting the preceding character. With the auto-repeat facility, it's a quick job to remove a few unwanted lines, though for dealing with longer blocks of text the PCW has added some unique keys of its own.

These are the Cut, Copy and Paste keys. Press Cut and the program will be ready to remove the text between the cursor's current position and wherever you move the cursor to, when you press Cut again. The text is highlighted in inverse video as you go, so you can see exactly what it is you are removing, and as with all operations on the PCW you can press the Can (cancel) key if you change your mind at any time. This cutting combines with the cursor movement keys, so that if you wish to remove a complete paragraph you place the cursor at the start of the paragraph, press Cut, press Para to move to the start of the following paragraph, then press Cut again. The offending text will slide off the screen. This kind of editing soon becomes second nature, though it's best not to get too confident, as I did, and press keys too quickly – Cut, Doc, Cut I should have pressed, but Cut, Alt/doc, Cut I did press, and sat there watching all the text that I'd wanted to keep sliding off the screen, leaving me with just the text that I'd intended to remove. A rare but salutary experience.

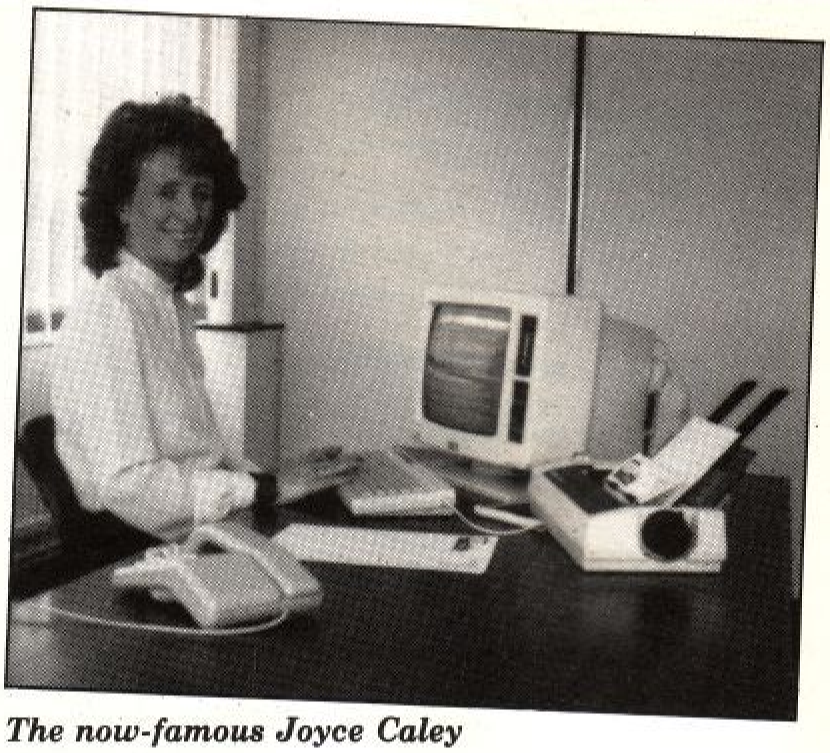
These keys don't merely serve to remove text, though, they are also the way in which text is moved around. Cut simply allows you to cut, whereas Copy allows you to

either remove something but store it in memory, or take a copy of part of a document into memory, with the required text again being highlighted in inverse video using the cursor movement keys before making the next Cut or Copy key press. If you wish to copy part of a document, you can then put it into memory as either a phrase or a block, each having its appropriate reference numbers, with storage room for 26 short phrases or 10 lengthy blocks. You then place the cursor wherever you want to move the text to, press Paste followed by the reference number, and the phrase or block will be pasted into the document at that point. I've found it useful for pasting names and addresses into letters, or a company might want to do the same kind of thing when preparing statements, for example. You could also use this for quoting from earlier correspondence, or from other files, without the tediousness of making sure you've retyped everything word perfect. LocoScript incorporates the essential find and replace feature, which is very straightforward, allowing you to check each change if you wish, or to have the changes made automatically to the end of the next paragraph, page or the entire document.

Slow saves

The only major complaint of mine about editing text is the save and continue feature. To stop editing a file you press the Exit key, which brings up a menu allowing you to abandon edit (i.e. forget the whole thing and remove the file if it's a new one, or retain the previous version if it's one you've been amending); or you can finish editing, meaning save what you've done and return to the disc management screen; or save and print, which is self-explanatory, though this option obviously doesn't come up if you're working on one file while the printer is occupied printing out another file; or finally you can save and continue, which saves what you've done so far but returns you to the file instead of the disc management screen. Unfortunately your cursor is returned to the start of the document, not to the point where you left off, which is what happens in most word processors. This doesn't sound like much of a drawback, as you simply press Doc to take the cursor to the end of the document, but to do this you must scroll through the entire document, page after page, which is quite a slow process. One virtue of this vice is that it does encourage you to keep everything in separate small files, which is a safer way of working, and before printing out it is possible to string all the short files together into one long one, though again this is rather a tedious business as you have to watch while each file is printed on the screen and the new longer files re-saved. For the time and the money the Joyce has saved me, almost like having a secretary of your own, it's an irritation I can live with.

While writing your text, you will want to make use of the various style and emphasis options (bold, italics, underlining etc) that are available, and there are no less than three ways of doing this! You could either use the appropriate function key to call up the menu allowing you to set, say, the underlining feature (the f3 key, which brings down the Emphasis menu), or you can use a special key which brings down a kind of Master Menu containing all the available options, and from this you select the underlining option, or finally and most simply you simply type the underlining code direct into the text as you go. This is done using the special Plus and Minus



The now-famous Joyce Caley

keys either side of the space bar, to set or cancel something, followed by the appropriate abbreviation, such as UL for underline, B for bold, I for italics, and so on.

Even this reasonably lengthy look at LocoScript doesn't cover all its features. There are naturally menus allowing you to arrange your page, set your margins and tabs, and have automatic page numbering – though note that Version 1.0 of LocoScript has a bug in it preventing you from adding the Page Number code. You can still use page numbering by editing one of the documents which has page numbers in it and which comes with the master disc.

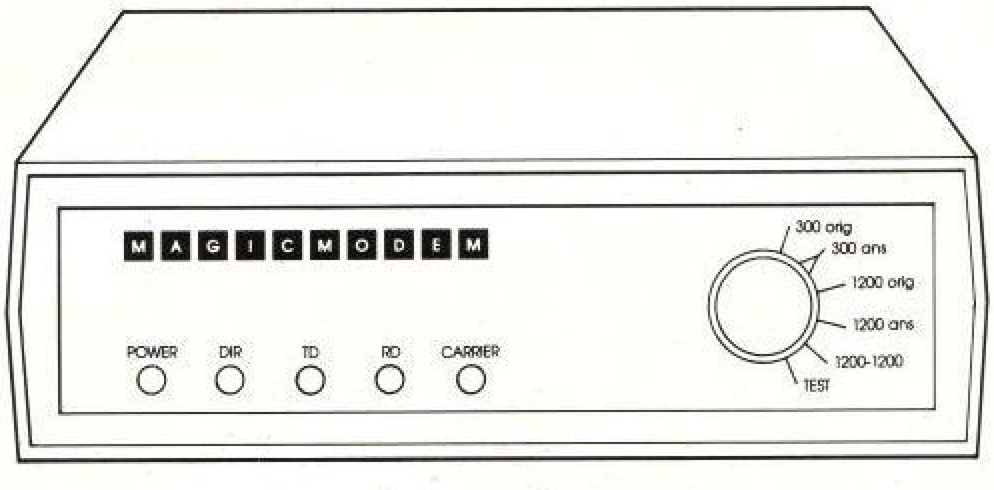
You can have separate Header and Footer zones of whatever size you choose, and incorporate in these repeated headings or footings to be printed on every page, and the automatic page numbering feature will allow you to print "Page 1 of 4", "Page 2 of 4" etc. You can prevent paragraphs from being broken between one page and the next, if you wish, and also avoid the common printing problem of ending up with a single line, or even a word, on a page of its own.

Nor have I even touched on the Limbo feature yet, which allows you to retrieve any files that you have erased as long as new files haven't been written over them on the disc. This has to be a sensible implementation of a common disc feature. What normally happens when you erase a file is that the name of the file is removed from the disc's directory, though the actual data stays on the disc until another file is written to cover it up. You just can't get at the data, that's all. With LocoScript, however, the data and file-name remain in this area designated Limbo, from which they can be called back if you erase something in error. There is no guarantee for how long the file will be reclaimable, as Limbo files will be over-written as the disc fills up, but at least you can reclaim those files where your heart sinks even as you press the key to erase them.

And if your heart sinks at the thought of remembering all this information about the use of LocoScript, next month we'll see how it works in practice and also try to include some shortcuts and ways round common problems.

ACU

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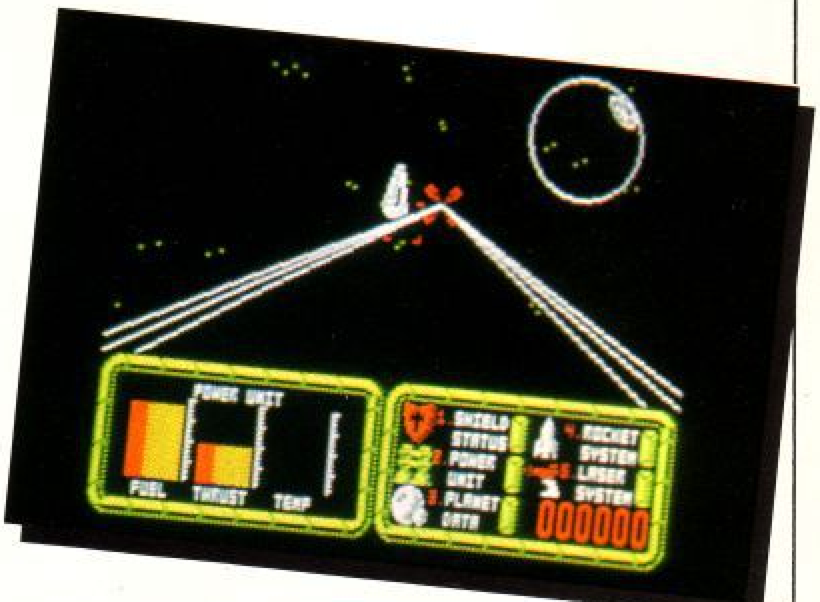
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SOFTWARE REVIEWS

BATTLE OF THE PLANETS





If you are in the habit of getting up on Saturday mornings you will have seen the Space-age cartoon "Battle of the Planets". Mikro-Gen have used this programme as the theme for their latest program. If you are expecting a Wally type sprite game then think again – this is a new departure for Mikro Gen, and an excellent one at that.

The first thing that strikes you about this game is the fact that it is so smooth and fast. It is better than Starion and has hidden line removal, which makes the objects appear to be solid and not just made of wire. From the fleeting glance I have had of Elite, I would say it is faster than that. After a loading screen you are presented with the front menu showing all the controls, and a variety of your opponents rotating in a window at the top right of the screen.

The plot portrays you as the latest member to be recruited into G-FORCE, The Galaxy Savers. Unfortunately they are busy elsewhere and so you have to solve this particular problem, cooked up by their Arch enemy, Zoltar, alone.

You are in a mini Solar system with five planets and Zoltar has sent out a part of his fleet to try and destroy the inhabitants. The ships will fly from planet to planet, and you must intercept them before they beam down to the surface. If you miss them in space, you must follow them down to the planet surface and then shoot it out 'Battlezone' style, avoiding the futuristic looking tanks and the other craft.

You can either shoot them with your laser, being careful not to let it overheat, or dispatch them with a rocket or two. This is a quicker alternative, but you can only carry a limited number at a time.

While you are on the planet you should replenish your fuel in the fuelship, and have your rockets and shields seen to in the repair ship. The five charts that can be called up into the bottom part of your status window tell you how your three shields are doing, what your speed is, how much fuel you have left and whether the engines are overheating, how many rockets you have left and how many enemy landing craft are on the nearest planet as well as letting you know how much of the population is left alive.

You have a separate chart telling you what your laser temperature is and how many laser cells you have left. If you allow your laser to overheat by shooting too fast it will not work until it has cooled down. As you use it you will gradually destroy the bank of laser cells that provide the power, rendering you weaponless until you visit a planet for repairs.

Near each planet there is a hyperspace gate which will lead to whichever of the five planets you select. It is a never ending battle as you shoot all the ships around one planet then chase off to one of the other planets before the remaining forces can do too much damage there. If Zoltars' ships succeed in killing off all the inhabitants on a planet then you have lost the battle. That is if you don't get blown out of the stratosphere first.

When playing, the bottom third of the screen is divided into two windows. The left hand one shows whichever of the five status charts you have currently selected, and the right shows you the state of the fuel, lasers, shields and what condition of the planet in an easy to understand, at a glance format, i.e. if your shield light is flashing then get to a planet fast before something hits you.

On the main display you only have a forward view, but there are hovering icons that flit around the borders of the main display to indicate what is out of view. For instance if there is an enemy icon flitting up and down the left hand border of the display then there is an enemy to your left. Turn left and when the enemy is in sight the icon disappears. This very soon becomes second nature. Simply point your ship in the direction of the icon you want, whether it is enemy, planet or hyperspace gate.

This game was selected for the National Computer Games Championship which took place on December 12, 1985 and if you think your score is especially good, then send both score and the code that appears with it, to Mikro-Gen, and you may be selected for the finals of next year's Championship.

Altogether, if you want a good enjoyable blast with some amazingly smooth and fast graphics, and enough plot to keep you occupied but not snowed under with complexity, then I recommend you buy this game.

AUTHOR MIKRO - GEN
PRICE £8·95

GRAPHICS	19	FIRST IMPRESSION	17
SOUND	12	LASTING IMPRESSION	18
POLISH	18	VALUE	19

COMMENT A space battle with style
All scores out of 20

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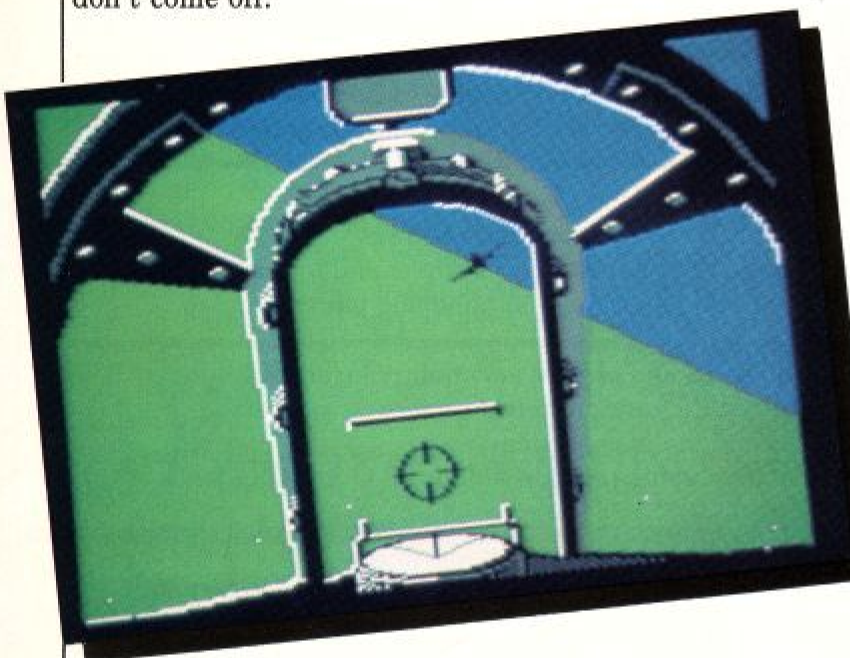


This is a decent combat flight simulator where you fly around in your Spit' and bash the Bosch without running up large repair bills for old Blighty. First though, one should read the flight manual. One feels very silly trying to accelerate down the runway with one's brakes on. Raising the old landing gear while still on the tarmac is also considered rather bad form.

The simulator itself handles quite well, loops barrel rolls, falling leaf spins, inside and outside loops and, of course, victory rolls over the runway à la Douggie Bader. Whether all this means it is too easy or whether experience counts, I don't know, but the first hands-on activity soon shows the games Achilles' heel: You can't see both the cockpit *and* the windscreen at the same time. A bit unfair, what?

Mind you, both the cockpit instrument panel and the view up top (complete with rear-view mirror) are very well done in mode 0 technicolour. All the instruments are real rotating dials and needles – none of this new-fangled digital muck. A bit worrying not being able to see the prop, though.

Certain little things help to overcome the 'what am I supposed to be doing here' syndrome, such as a little stripe of pixels running down the right-hand side of the screen which start to disappear if you get too close to the hard stuff at the bottom. 'Seat of the pants' pilots of American persuasion can judge the airspeed from the noise of the engine. One can knock up a good 400 miles per hour in a steep dive and the wings still don't come off.



Before worrying about getting too low too fast, one has to get the jolly old bird of the ground. Push the revs up, cry chocks away, pull back on the stick and up we go. As soon as the Spit' is airborne, raise the gear and ease off on the stick and flaps. Failure to ease off results in a manoeuvure which is technically known as a stall – the nose goes up, the tail goes down, and the nose follows it. You bounce a bit hard on the tail-bone old boy.

Sound effects are there – you hit the ground with an awful crunch and the guns go rat-a-tat. The engine noise has a strange coming and going hum to it which would have me returning my plane to the hangar for a service. Probably something to do with the missing propeller.

There are three ways of getting at Jerry: Training, combat and combat training. Training lets you practise your technique of taking off without the hinderance of a damn Fokker blowing off your tailplane. The really tough bit is putting it all back down on the ground again in one piece. Nice of Jerry to leave us alone for a while, it gives one time to sit back and remember to put the wheels down.

Combat training is the best bit of this simulation, practically unlimited ammo and plenty of bandits, all capable of a brilliant dogfight. You start off up in the air at 10,000 feet (no worries about stalling) and usually with a bandit on your tail, trying to blow it off because he was barred from your practicing session. That German chappie, Herr Ahrman-nerleg, suddenly becomes less of a sport and more of an utter cad, always attacking you from the rear and refusing to come up front and take it like a man.

When you actually get round to it, the real thing is a bit of a let-down. There is the minor detail of trying to locate the odd invading bandits from a given bearing and altitude using your map and gyrocompass. It takes ages to find the Messerschmits and one tends to frequently run out of petrol just after one has sighted the bounders.

Not a bad little game really, especially if you buzz about in combat practice. Still no details (other than the runway) on the ground (the excuse of thick green fog doesn't hold up to close examination), but this is at least as good as the Digital Integration flight simulator. It's all a matter of taste – you may well be a speed fanatic and prefer F111s to Spitfires, but only this game lets you save your bag to disc or tape to prove your worth to your friends. Doing well in combat reaps its rewards for the few, in the form of becoming Group Captain, possibly the proud possessor of the DSO or DFC. You get more gongs at this game than the whole of 633 squadron.

One wonders what on earth Amsoft are going to do to this program when they try to sell it to the Germans? Have to be tactful here, mustn't mention who won the war must we? *(Oh well we didn't really want to sell any copies of ACU to Germany – Ed.)* Could we have some new-style air aces, confirming their bags by sending floppy discs back and forth?

AUTHOR MIRRORSOFT / AMSOFT
PRICE £8·95 £13·95 (disc)

GRAPHICS	16	FIRST IMPRESSION	14
SOUND	11	LASTING IMPRESSION	15
POLISH	14	VALUE	15

COMMENT Benefits from being simple to master

SPELLBOUND

Hot on the heels of Finders Keepers comes Spellbound from the same author. But it isn't just a tired re-work of the same piece of code with new scenery. Graphically it looks familiar but the game itself is infinitely better.

Many people have tried to produce that infamous thing "an arcade adventure". Usually they have ended up as a fast and furious shoot out with the added ability to pick things up. In Finders Keepers it was possible to trade objects that you found but not a lot more. In Spellbound however there is a much wider range of options. It might have been difficult presenting the user with a whole host of different things to do so a very clever nested window technique has been used.

Anyone who has played with Locoscript on the Joyce will know how one key press will bring up a short list of options then picking one of these will take you on to another short list of options and so on. The same sort of thing happens in Spellbound. Pushing the fire button brings up a window that presents a number of options (Pick up, Drop, Give, Take, Cast Spell, Read, Examine, etc). If 'Take an object' were chosen then a secondary window would overlap the first giving a list of characters from which you might want to take an object.

Once the pointer had been moved down to the relevant character another push of the fire button might bring up a tertiary window which again overlapped the previous two listing all the objects carried by that person. Once the correct one had been picked (fire button again) a fourth window would appear asking for confirmation. When the fire button is pressed for the fifth (yes fifth) time the action will be carried out and all the windows will disappear to leave the scenery just as it was before you started.





Five pushes of the fire button plus the up and down movement to position the pointer might sound like a lot of work just to take an object but it soon becomes second nature, besides which, it is only by this method that the complexity necessary for this to rival a real adventure could be included. One window giving just eight options wouldn't give much scope for the great range of possible actions in the game.

Just as in a real adventure, you wander about picking things up and examining them (if they have a read status of "Yes" then the next thing you do should be to read the object). One of the first things you find is a "white" herring. It's a good idea to read this because it gives you a clue about what to do next. By shuffling various objects about the place on the first level and interacting with the characters you find there you will eventually manage to open a door at the end that allows you into a lift. Inside this you can travel to a number of other levels each of which have their own objects to be found and puzzles to be fathomed out.

There isn't much point in detailing the nature of any of the problems here because that would render the whole thing quite useless. Needless to say though, it's bound to take many hours of enjoyable play before you complete the quest. Just to make it that little bit more difficult there is a limit to your energy so that you must find some way of rejuvenating your strength. There are also some rooms that mean death unless you enter carrying the correct object (e.g. a glowing bottle will be needed fairly early on in the game).

Your character can just walk left and right but if you really want to get somewhere in a hurry he is also capable of some quite energetic leaps. This will be needed to get over things that might otherwise bar the way. Like a lot of the better adventures, not all the objects weigh the same amount so it is sometimes necessary to drop one or two things before a heavier object may be picked up. Details such as weight, whether it can be read and whether it will be destroyed if it is dropped can all be found by examining an object. The other characters that you meet can also be examined to see their current status of magic, strength and the like.

As someone who finds adventures a little tedious (except for the excellent Hitchhikers Guide of course) and would much prefer to be blasting away on a joystick it is refreshing to find a game that strikes an interesting balance between the two types of game. The overlapping window technique certainly seems to be flavour of the month in a number of camps and not without justification. It is a clear way of making it very easy to pick one of a large number of options. Spellbound is one of the new Mastertronic "Mad Games", so it is still pretty cheap even if it does not fall into the usual budget pigeonhole. **ACU**

AUTHOR Mastertronic

PRICE £3.99

GRAPHICS	15	FIRST IMPRESSION	14
SOUND	12	LASTING IMPRESSION	16
POLISH	17	VALUE	19

COMMENT Further proof that games can be cheap & good



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Into adventures with Bill Brock

As we saw last month there are two golden rules in adventure gaming:

1. Never get Lost
2. Know the Language

Rule number 1 is often difficult to follow. Not only may there be one-way paths and mysterious transportation rooms (sometimes called trapdoors!) but nearly all games have mazes incorporated into them.

Usually the first you know of this is when you move to a new location and find the description is the same as where you have just been. Don't panic . . . do not repeat the movement command thinking that you have typed something incorrectly. You are either equipped to tackle the maze or you are not . . . stop and think for a moment or two.

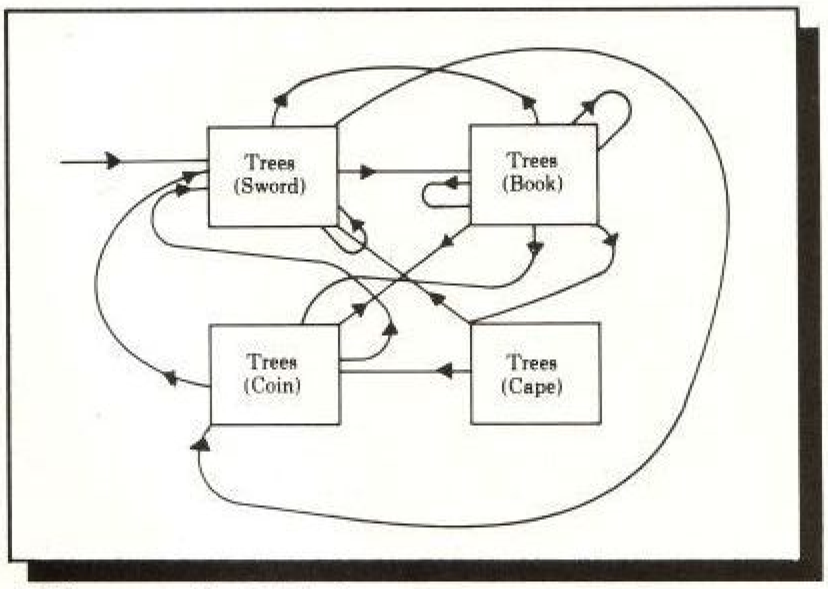


Figure 1: And this is not yet complete!

If you are not prepared for a little maze mapping then either 'QUIT' and reload a saved game position or thrash around a bit and see what you can find, either the way out, or some sort of 'goody'. Mazes often hide useful things or hidden pathways.

The reason for quitting is that mazes by their very nature are devious places and our standard form of mapping will not be very satisfactory – moving North after moving South will probably not bring you back to where you started from. Each maze location will have a description but in all likelihood that description will be the same, something along the lines of "Trees surround you. Paths go in all directions". Nevertheless study it carefully. You may find either a slightly different wording or perhaps a comma out of place.

One thing is certain. You must map mazes carefully and completely – it is the obvious place to hide something worthwhile. Now, as all places look the same you cannot tell if you have already been there, so first of all you must find a way to make each location unique. Somehow they must appear different so that you can define each location and add it to your map.

The traditional way of solving a maze is to drop something at each location so that the description will read something like this: "Trees surround you. Paths go in all directions: There is a book here". This defines each location but even so our previous form of mapping will probably make everything clear.

Because paths will go in all directions, the standard map will look a complete mess and will be difficult to understand (fig. 1). A better system is to draw numbered boxes and to indicate to which box each direction from any one box goes (fig. 2).

This requires that you have got something to drop at each location, although if only one location does not have an additional object it will still be unique . . . think about it.

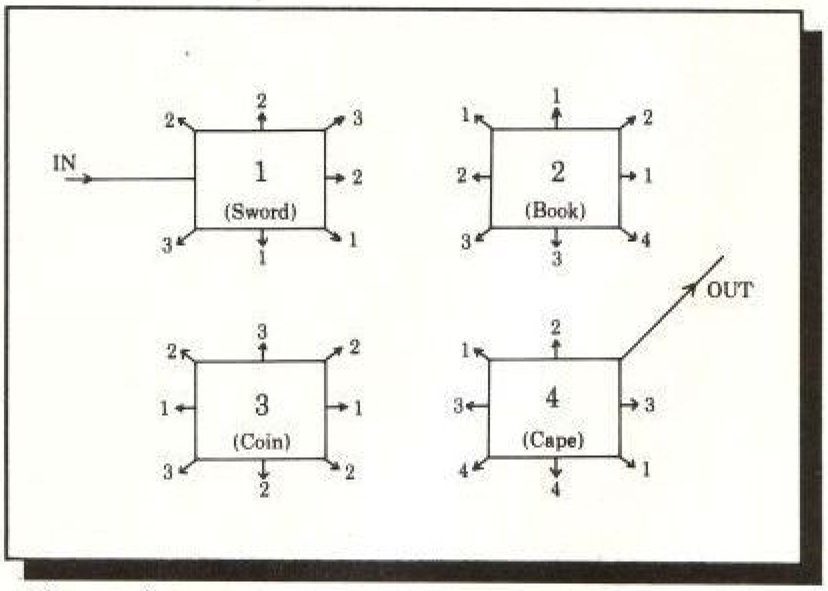


Figure 2

Programmers are devious characters, so do not expect this system to work every time. You may have to get more objects because the number you can carry is limited . . .you may have to map part and repeat the process with a second or third section.

One thing is sure (well reasonably) and that is: mazes can be solved – you just have to find the right way. In the example given above, perhaps you should try "Examine path" or "Examine trees" at each location.Theremay be something significant at one or more locations. Perhaps you are carrying a magic sword which glows in certain places.

Lazy mapping

For those of us that are either lazy or unable to draw mapping rectangles in the right places. Print n' plotter products have the ideal thing. For some time now they have been selling the "Adventure Planner".

This is a 50 sheet tear-off pad, where each 420mm × 296mm sheet has an 11 × 14 grid of useful sized boxes for you to annotate as necessary. There is space on each page to record the name of the adventure and room for a number for playing notes. Designed for the job it makes a fine addition to the programmer's arsenal. It is also very handy if you are designing games.

Perhaps because of their awkward size when stored in bulk, not many shops seem to stock them, but they can be bought mail-order for £4.50 from Print n' Plotter Products Ltd., 19 Borough High Street, London SE1 9SE.

Where's the rum?

Adventure International must rate as one of the most prolific adventure teams and with Level 9 and Melbourne House they are the top performers. Adventure International seem to have the knack of taking an existing scenario and turning it into a workable adventure, "Robin of Sherwood" and "Seas of Blood" being their latest.

"Seas of Blood" is based upon the Penguin Fighting Fantasy book. This is a multi-option adventure that has proved, together with numerous others by the same authors, that role-playing adventure books can capture the imagination of the readers that buy them in their thousands.

The storyline, as in most of Adventure International's games is fairly simple. You are captain of the pirate vessel "Banshee". To complete the game you must find and retrieve some 20 treasures and take them to the top of a mountain at the southern end of the Island sea. Perhaps why you have to do this will become clearer when you get there . . . "Seas of Blood" has good, colourful graphics and the simplistic operating system used in their other games. Input commands are nearly always given in the form verb/noun and the vocabulary understood is not very great, in fact this side of all Adventure International programs is quite unsophisticated.

Most times if a word is not recognised it is ignored. Strangely enough, although this can sometimes be misleading, it does encourage a simple, direct approach, which is perhaps one of the games' attractions.

Note that the game is the first of the "Fighting Fantasy" titles with the emphasis on fighting. Whenever you attack or are attacked the game displays a pair of spinning dice. A series of throws determins the outcome of the battle.

Random factors such as these can ruin an otherwise good adventure game but this system does seem to work quite well, even if my dice did not always seem to be as random as they might be. With a little patience you can save your position before a battle and keep returning to it until you come through unscathed.

When you board the Banshee you move by typing "Sail South", "Sail West", etc. A bit long-winded . . . but that's the system. There are over 400 locations but as a very large number of these are the same view of the sea from the ship don't get too excited about the graphics.

This simple view of the sea can pose problems – like mapping. It is very important to know where you have been, and more important to know where you have not been. You must find provisions. Without them the crew will mutiny and the game will end.

Each sailing move costs you one unit of provisions and can indirectly help you with the mapping. Check the number of "Sailed moves" by noting the provisions left. The Island of Nipper is said to be at the southern end of the Island sea . . . don't believe it. I have not reached land South (my provisions ran out) and I suspect that this sea goes on forever. Just take care with those maps.

On a couple of occasions I ended up stranded on the shore, unable to "Board Banshee" or "Go Banshee". Whether this is a bug or a "game puzzle" time will tell. Note the use of "Go XXX". Adventure International often use this syntax so if you cannot get into what is obviously an interesting location, try "Go entrance", "Go Passage", "Go Hole" and the like.

Fun on the High Seas, keep your wits, and your cutlass, about you and enjoy the cruise.

Film fun

Ocean Software seem to have jumped in at the deep end with the first adventure game, "The Neverending Story". With over 100k of program spread over two cassettes it has proved to be an interesting challenge for lots of adventurers if the sales over the Christmas period are anything to go by.

The game follows the general outline of the film (and the book) with a lonely small boy – Bastian Balthazar Box – finding an old book which contains the never ending story of the world of Fantasia. As he hides himself away and reads it he becomes part of this story. He sees and reacts to Fantasia through the eyes of Atreyu (another small boy).

Fantasia is the eternal "Land of good" gradually being eroded by an evil "all consuming nothing". The empress of Fantasia is ill and weak and the land desperately needs a saviour to pull it back onto its feet. There are no prizes for guessing who has the job.

The graphics are great, colourful and novel, the music wins the editor's award for best music on the Amstrad. One main screen is displayed across the top third of the screen. This is then overlayed with a small picture showing either who is present or where you are. A further six small pictures show what you have with you. Some of these can be a little difficult to decipher if you did not know what they are.

The basic command interpreter is fairly simple minded, understanding a very small vocabulary and needing only the simplest verb/noun input. This is the weakest part of the game and will hopefully be improved in Ocean's future adventures. You have to "Get Falkor" (the flying Luckdragon) before you can "Fly West" and having finished with his services you then have to "Drop Falkor". All the objects are shown in detail and there is no "Examine" command.

The first part has about forty locations and although you can die if you stay too long in the swamp there is a fairly logical selection of "goodies" to be found and used. It has been suggested that whatever is found and is





not used should be carried with you to the next part – not bad advice but I'm not convinced that everything has a positive action to play in the final solution.

Mapping this part is not difficult and will save a lot of wandering around. Save your position fairly regularly. It does not take long and will save you getting frustrated as you gradually learn what to do and so do not have to start from the beginning.

Generally the text will give you the right hints to assist at the right place at the right time. If in doubt remember "fire destroys" . . .

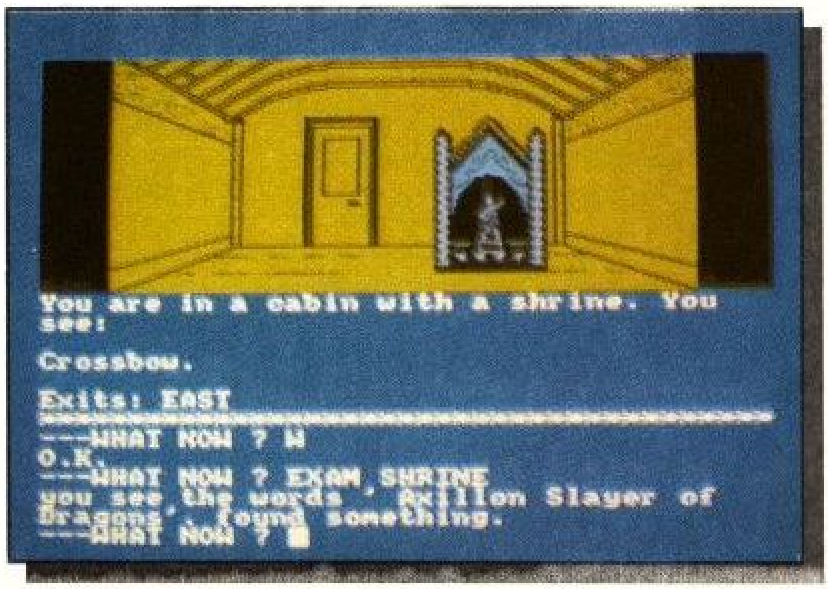
Once you have loaded the second part save your position. There are over 25 lethal moves within six moves from where you start. If you have not got a position to restore you will have to reload part one.

Your (Atreyu's) wonderful dragon steed disappears at the start of part two but will reappear in the nick of time when you have discovered all there is to know about Spook City (that's where you landed) . . . so persevere with your exploring.

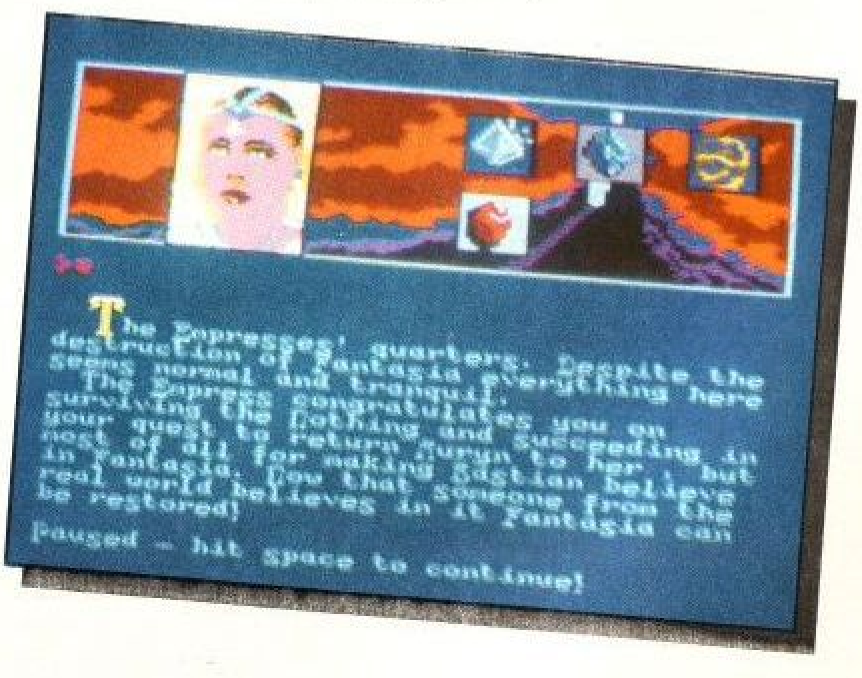
Although there are no deadly traps awaiting you at the beginning of part three . . . follow the same procedure as before – it is good practice for the future. This last part is really very easy . . . if you have read the first few paragraphs of this month's offering – yes . . . mazes.

First there is the twisty wooden maze, then the twisty stone maze and finally the twisty glass maze! Just do not panic but sit back and enjoy yourself! The final solution like many adventure games comes as a bit of an anticlimax . . . but at least you meet the lovely Empress, who seems to be fit and well for her final speech . . .

The program notes make mention of other characters – good and bad – that should pop up now and then, but there appears to be little interaction except for the atmosphere they add to the story. For the first two parts, make a note of the things you find and try and find a use for them. Never be without the good-luck charm Auryn for longer than necessity dictates! All in all, a good enjoyable adventure . . . where is the next one Ocean?



Above: Scenes from Seas of Blood
Below: It's a Never Ending Story



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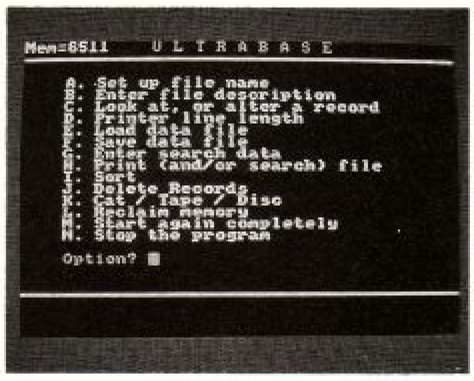
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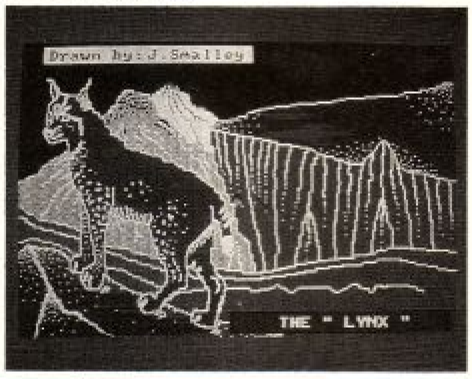
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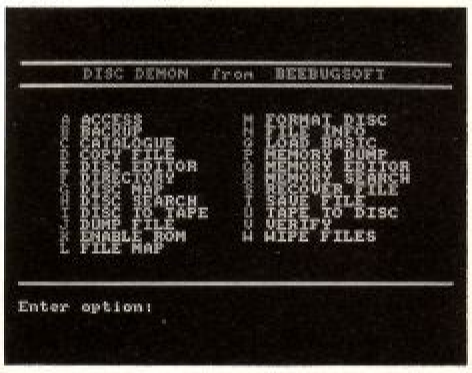
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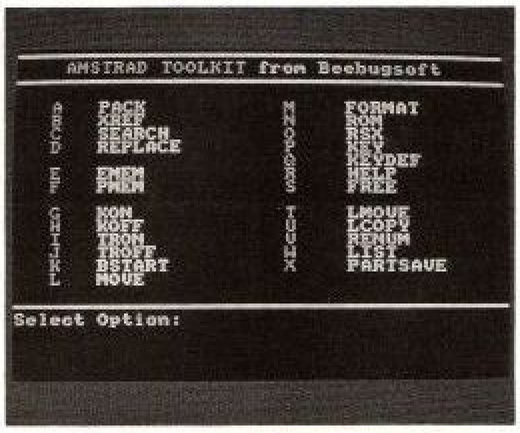
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GOING LOCO

Let us continue our look at Locomotive Basic. What gems of useful information can we think of this month? Alex Martin takes a look at some more of the Basic keywords.

CAT

The CATalogue command displays information about blocks of code recorded on tape, or files recorded on disc.

When used to catalogue tape files, the CAT command also checks that the blocks can be read. This is equivalent to the VERIFY command available on other machines. To verify that a program has been saved correctly, simply rewind the cassette and CAT it. This has no affect on the program already in memory. If you get READ ERRORS then resave the program. The CAT command also displays the file type:

A Basic program	$
A protected Basic Program	%
An ASCII text file	*
A machine code program	&
A protected machine code program	'

CHR$

This function turns a number into a character. It gets heavily used to print the characters unobtainable from the keyboard.

```
PRINT CHR$(143)
```

This prints a character sized blob on the screen. Another use for CHR$ is to set up useful strings of control codes. These can then be used as additional commands or just to simplify programming.

Let us take a look at some of the control codes.

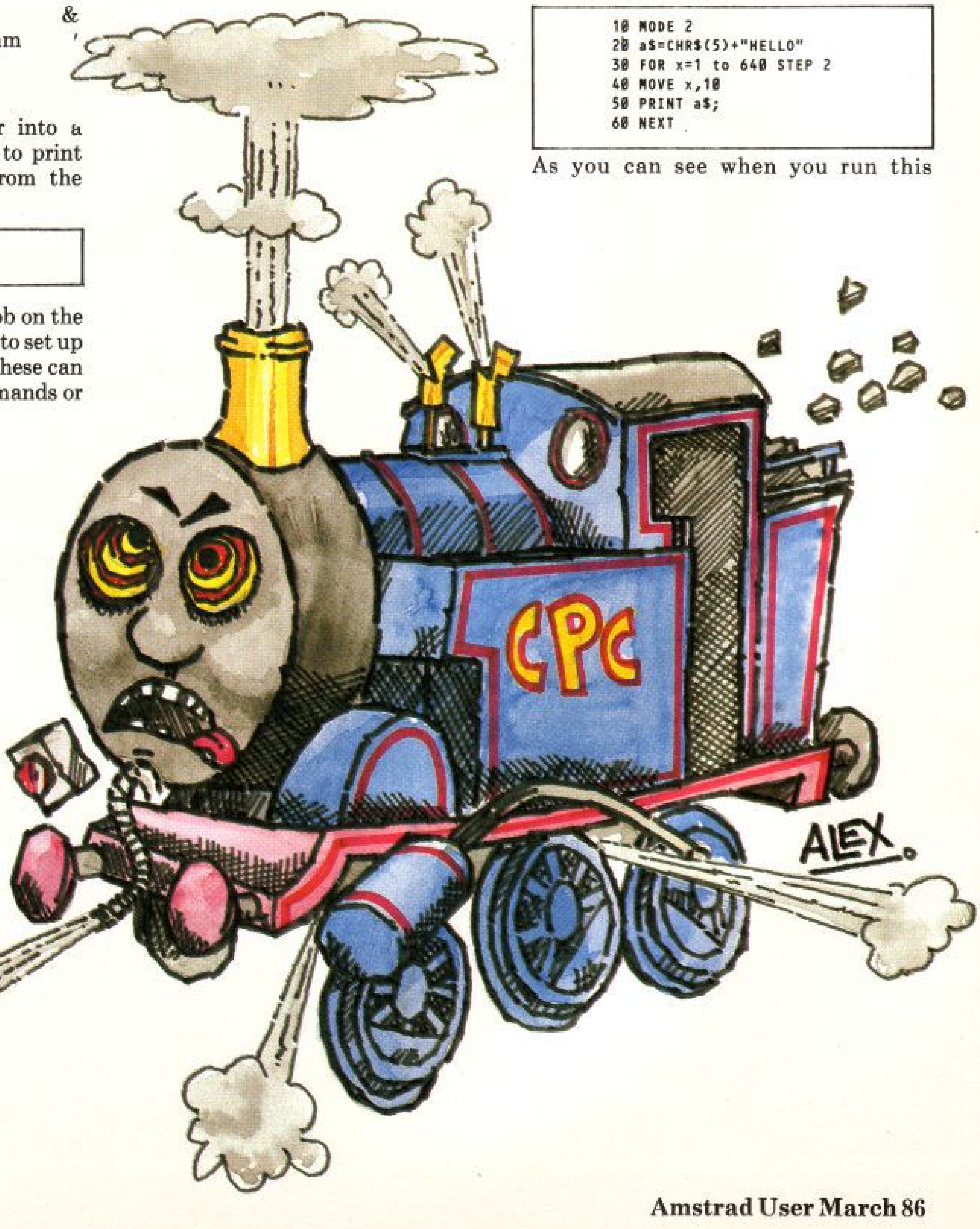
```
PRINT CHR$(1);CHR$(13)
```

The CHR$(1) instructs the computer to print the symbol associated with character 13 rather than obeying its control code which would be Carriage Return. The first 32 characters (0 to 31) are control characters. Some of them, like the above example, have parameters.

Try this:

```
10 MODE 2
20 a$=CHR$(5)+"HELLO"
30 FOR x=1 to 640 STEP 2
40 MOVE x,10
50 PRINT a$;
60 NEXT
```

As you can see when you run this



program CHR$(5) sends the next character to the graphics cursor. Only the H in Hello is sent. The ELLO is printed to the text screen.

Control codes 8 to 11 move the cursor around. For example PRINT CHR$(8) will move the cursor left a character. Codes 9, 10 and 11 move the cursor right, down and up. By stringing together the appropriate codes and characters it is possible to produce a string that prints a block of characters or moves the cursor in a particular fashion.

```
PRINT CHR$(7);
```

Character seven is the bell character and therefore goes 'bleep'. If it goes 'ding' you have cause to worry. This little command is useful when developing programs: giving an audible indication of a program's progress.

There are a number of codes that clear specific areas of the screen to the paper colour. Character 16 deletes the current character position where the cursor is. This is equivalent to a string of commands to print a space and then move back to the original position. However it is much faster to use chr$ 16 than printing a space. This may be useful to know when doing animated displays in Basic.

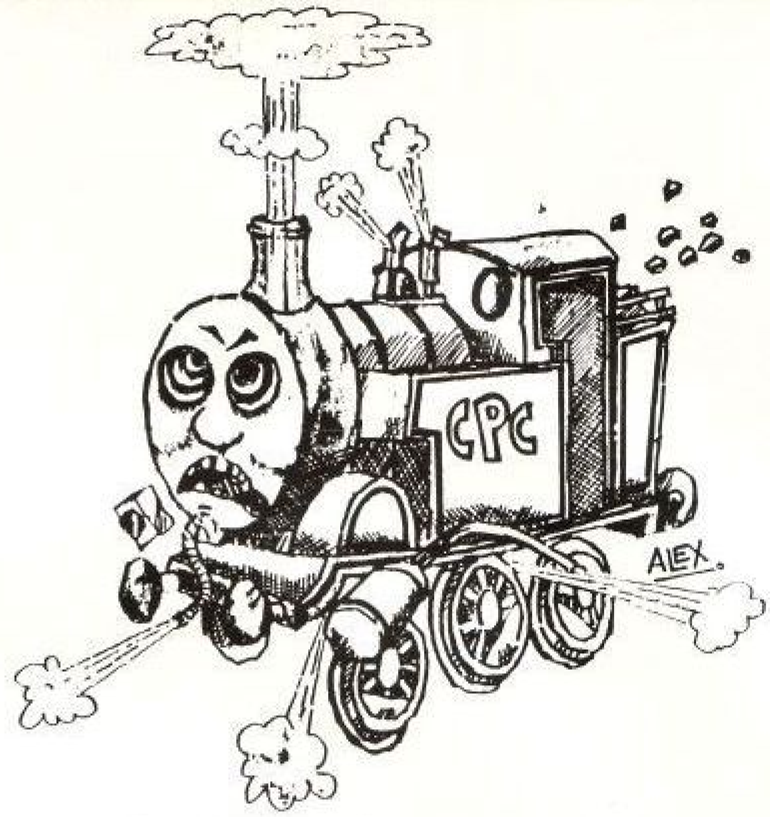
CLEAR

This command does a lot of things, some of them you may even want to happen to your program. CLEAR wipes all variables and files. This means any variable that currently exists will be reset as if the computer has just been switched on. With Amstrad Basic, because you don't need to declare a variable before you use it, it makes no difference what variables exist already. The exception to this is array variables which will be either dimensioned implicitly to ten subscripts or explicitly to another number. CLEAR takes care of this by erasing all arrays.

Open files are zapped. If you have anything lying around in a data file, close the file before doing a CLEAR, or you'll lose it.

The interesting thing about CLEAR is that it makes Basic forget that it is busy executing a WHILE . . WEND, or FOR . . NEXT loop. It also forgets that it is in the middle of a subroutine and will not expect a RETURN. This is useful when you wish to restart the program from the middle of a muddle. A muddle being several levels of nested subroutines. *(Yuk! So Unstructured – Ed).*

Let me expand on this: if you were to jump back to the start of your program out of a routine; a routine which had been entered via the GOSUB command, you would be starting your program with a return address saved away somewhere. This record is clogging up your computer and if you continue to execute GOSUB commands eventually you will run out of space for storing the addresses. The CLEAR command throws away the record of the return addresses allowing you to continually leave the subroutine.



ERASE

ERASE has a similar function to CLEAR and so it is included here. This command lets you zap arrays that you've created. If you attempt to erase an array that doesn't exist you will get an improper argument error. Having erased an array you can redeclare it with new dimensions.

CLG

CLG clears the graphics screen. This means the whole screen after a MODE command or just the graphics window set up using the ORIGIN command. The graphics screen will be cleared to the graphics paper ink, which is specified by the optional parameter to CLG. If no ink is specified then the previous graphics paper ink is used.

CLS

CLS clears the current text screen window to a paper ink. When you switch on the computer and type CLS the screen clears. What is the difference between this and typing MODE 1, you may wonder. CLS clears only the current text screen window, which can be an area set to a size smaller than the screen. CLS will only clear that smaller area. Also it will be cleared to the paper ink for the current stream.

Now I suppose you want to know what a stream is. Okay here goes. There are ten streams (0-9). Stream 8 and stream 9 are to do with printers and cassettes and need no further mention here. Zero to seven are screen streams and are all equivalent to each other in the way they work. The current stream is the stream that the next character will be sent to. Each stream can be set to be a specific area of the screen, which we call a window. When the computer is switched on, stream zero is used and all the windows are set to cover the whole screen. Each stream has its own paper ink and pen ink. It also has its own cursor position and keeps a record of whether it is using an opaque or transparent background when it prints a character. Streams can also be set to print text at the graphics cursor.

Here is a little example to illustrate CLS.

```
WINDOW #1,10,15,10,15:PAPER #1,3
```

This sets up a window for stream 1 which defines a square in the centre of the screen instead of covering the whole screen. The paper ink for stream 1 is then set to ink 3 (red after switching on).

```
CLS #1
```

This clears the window for stream 1 to the paper ink associated with it. You should have a red square in the middle of your screen. Who says screen graphics are difficult?

Printing control code CHR$(12) has the same effect as CLS and is ever so slightly faster.

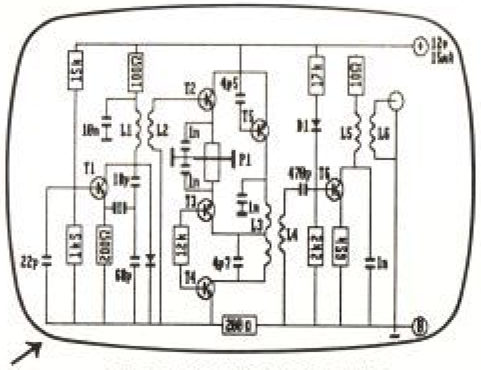
CONT

CONT is a very useful debugging aid. It allows you to restart your program after stopping it. You can stop a program in one of three ways; pressing ESC ESC will stop it, also including STOP or END in your program will stop. The reason you want to stop it is so that you can print out some relevant variables and see what their value is. This is done in direct mode and doesn't alter the program in memory. If you edit a line and then try to CONT you will get the message Cannot

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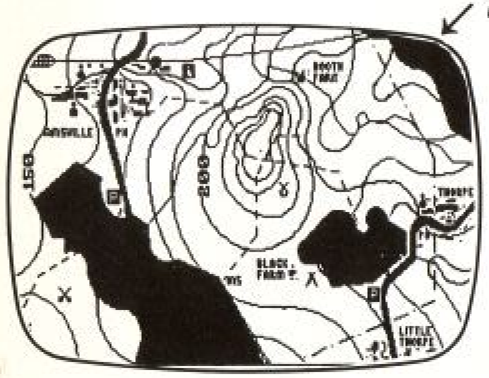


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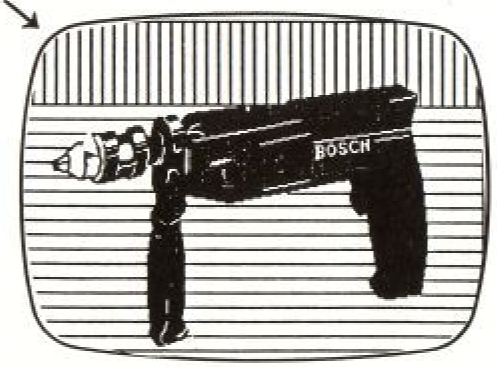


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CONTinue as the program will not continue after it has been altered.

So you've printed out a variable and it's the wrong value. Change the variable to the correct value from direct mode and CONT your program. The program should continue, operating correctly.

CINT and CREAL

And now a quick mention of CINT and CREAL. CINT converts a number which must be in the range –32768 to 32767 (but can have a decimal point and trailing figures) to an integer (with no decimal places). CREAL, on the other hand, does the reverse and takes an integer number and allows you to change it to real representation. CREAL and CINT are the sort of functions you will find handy one day but you don't need them now.

DATA

There are three commands DATA, READ and RESTORE that need to be examined together. Many readers will already be familiar with the DATA command. Bad luck, you're going to get it again! The DATA command allows constant data to be put into programs. The sort of data you may find in other people's programs are machine code ready to be poked in and data for sound commands – to play a tune, sometimes in the value that the sound command requires, sometimes in characters indicating the note to play. Data can also contain strings of text.

The best way to think of data held in statements in a program is as one long list. The READ command reads the first piece of data into a variable. The data read must be the same type as the variable being read into. There is an invisible pointer that Basic uses to point to the next piece of data to be read. This is stepped on after every READ. The RESTORE command allows the pointer to be set to the first data item in a particular line. One useful feature of DATA statements in Amstrad Basic is that strings can be held in two forms. The two forms are quoted and unquoted, referring to the double set of quote marks that delimit a string. Quoted strings have quote marks and anything between them is counted as part of the string. Unquoted strings have no quote marks. Anything in the line of data is taken as it appears on the data line except for commas which separate strings and colons which have strange effects.

This little program illustrates the strange effects. Don't bother to try this on a 1.1 version of the machine.

```
10 READ a$:PRINT a$
20 DATA What are all these funny
   characters:input:string$:call:pi
```

Something useful that you may wish to know about DATA is that it will accept a null entry (where two commas are next to each other), and take it as a null string for a string variable and zero for a numeric variable. In a listing which uses a large number of zeros in data statements, time, typing and memory space can be saved by leaving the zeros out and the commas in. The most common use for data statements is filling an array. It is much neater to have a little loop like this:

```
10 FOR x=1 TO 10:READ a:b(x)=a:NEXT x
20 DATA 1,3,4,2,5,,8,9,3
```

than a whole bunch of direct assignments like this:

```
10 b(1)=1:b(2)=3:b(3)=4:b(4)=2:b(5)=5
20 b(6)=0:b(7)=8:b(8)=9:b(10)=3
```

The best way to learn your way around Locomotive Basic is to practice. Have fun.

ACU

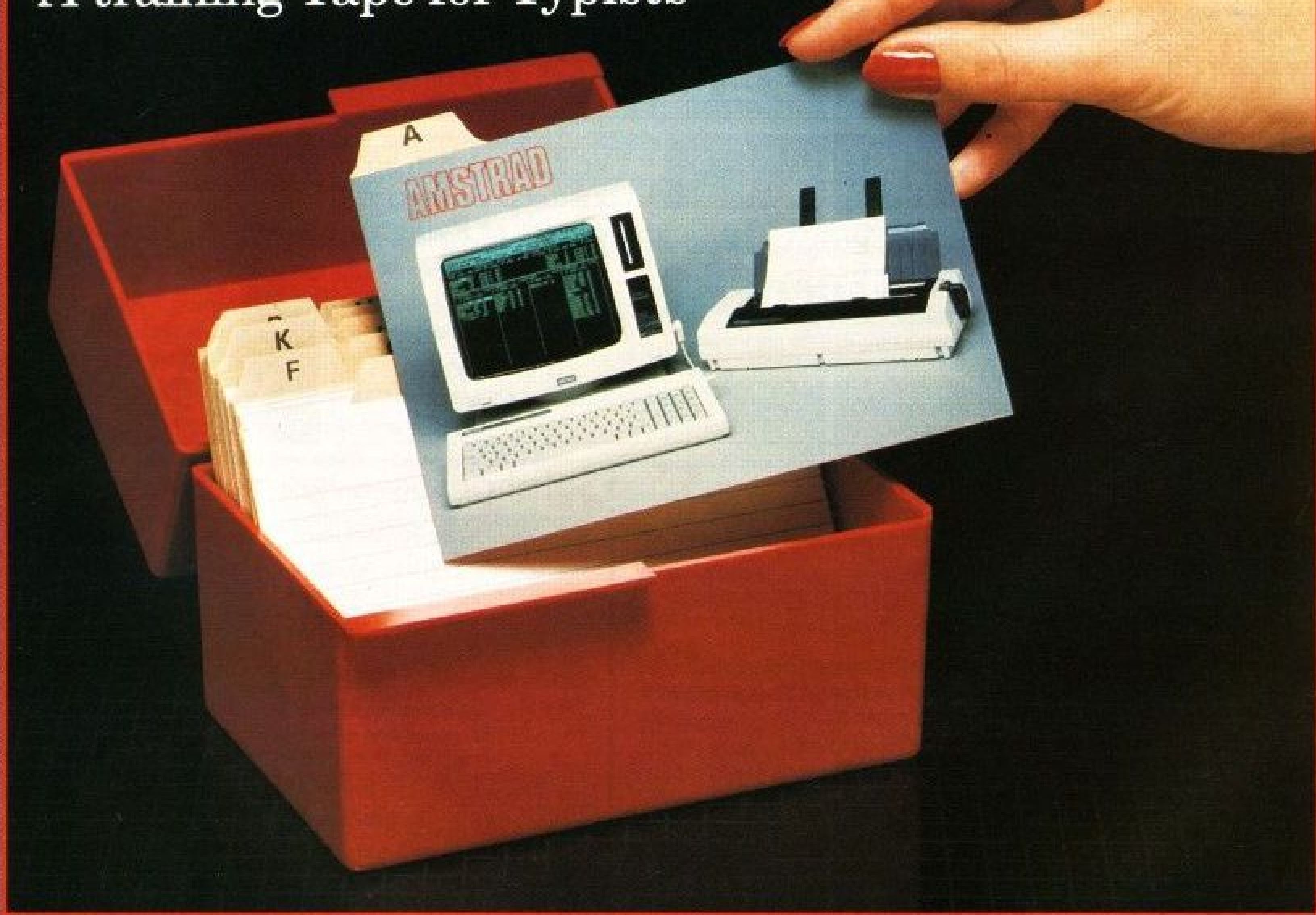
Amstrad Business Computing

The supplement for Amstrad Business Computer Users

Free
March 1986
Volume One
Number four

Cardbox from Caxton
The simple Database

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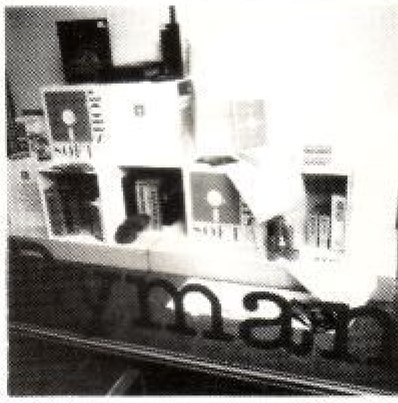
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SOFT SHOP

Old ones, new ones

The Amstrad business computing scene is living up to expectations. The Which Computer Show stand provided food for thought for those of us attending in an "advisory" capacity, and helped to underline the trends that had emerged since the launch of the PCW8256.

Fact number one: most owners do not read and have no interest in computer magazines. Fact number two: most owners are a great deal more realistic in their expectations and outlook than perhaps we might have expected given the experience of the IBM PC market.

The answer is easily uncovered: owners who buy the PCW8256 for business use are willing to accept that the prices of hardware and software do not include limitless tuition services. Since many own small businesses they have a far better grasp of reality than the sheltered corporate user who is stuck in front of the firm's PC and told to get on with it.

The additional incentive that comes from being the person that bought the computer and software and also the person most directly likely to benefit from its correct use cannot be over emphasised.

The real cost

A particularly significant feature of the PCW8256 scene is the way in which training courses are being lapped up by owners. Ever since the welfare state made education in this country "free" (ever heard of income tax, rates etc?), it has been difficult to persuade the man on the Clapham omnibus that he should part with money for educational services.

The government initially poured money into micro education in much the same way as ever until everyone "assumed" that someone else would pick up the tab for computer literacy.

Software publishers built in huge margins for "customer support", and those who resented paying 75% more to subsidise beginners made piracy socially acceptable among hackers.

PCW8256 owners, bless 'em, are not (yet) steeped in the wiles of the software scene, and just want their software and hardware to help them run their businesses and their lives, and have a refreshingly direct view on the whole matter.

They readily accept that the most expensive part of computer ownership is the time taken to learn and practice, and many are willing to buy a program to "play with" at home until they feel comfortable enough to use it in earnest.

It is to be hoped that the software industry recognises this new breed of realism and takes the opportunity to elevate software training and education to the realm of a professional service alongside law, medicine and accountancy.

William Poel

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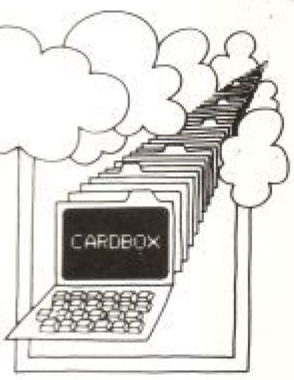
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ABC SPECIAL

Open the box...

Choosing a database is rather like selecting a fine wine – the external packaging looks appealing but the contents can leave a bad taste. If you own a PCW8256 or use CP/M on an Amstrad micro there's a plethora of database software to choose from. This looks at one such package, 'Cardbox' from Caxton Software.

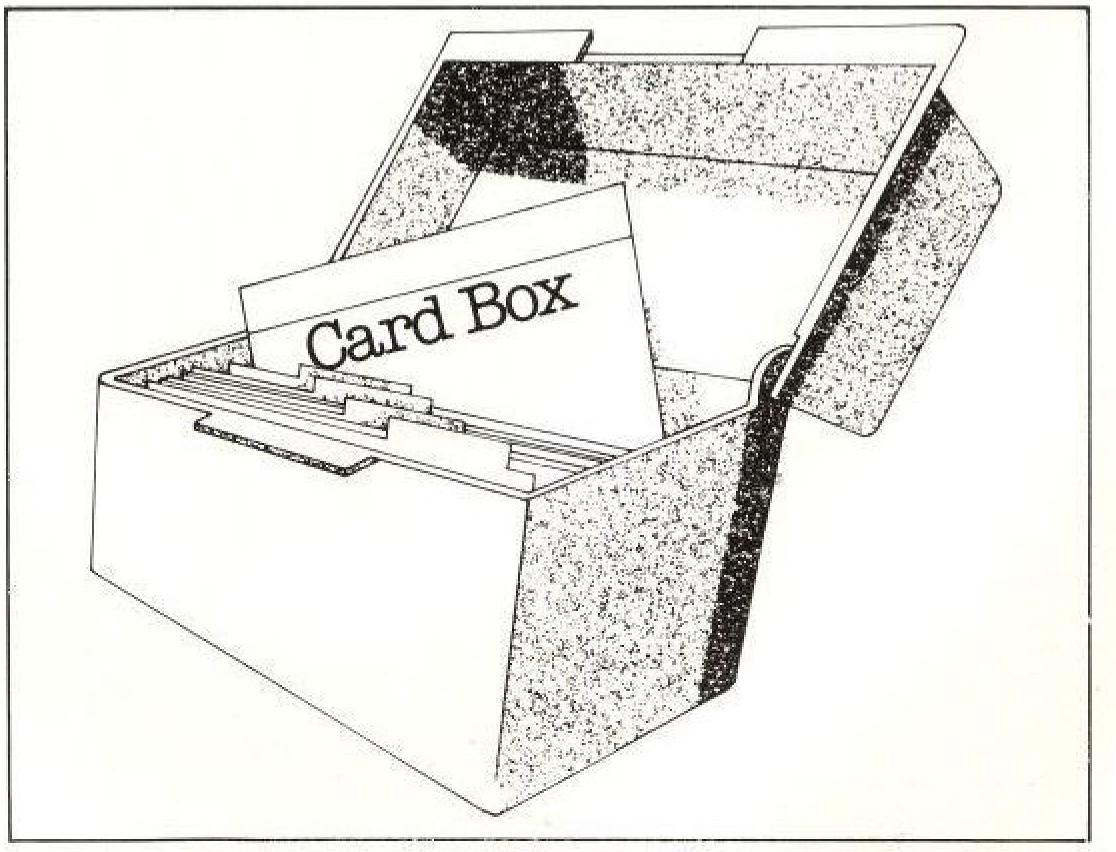
Cardbox is the electronic equivalent of a desktop card filing system with the advantages of searching for specific information quickly, unlike its manual counterpart. The idea of thinking in 'cardbox' terms appealed to me as databases can often lose the novice in descriptions of 'fields', 'records' and other such necessary jargon. All most users want to do when they purchase a database is to get it up and running as quickly as possible. Learning the finer aspects of database programming is often the result of desperation rather than interest in the capabilities of the software. So how did Cardbox measure up to my critical eye?

The program is supplied in a ring binder with 60 pages of documentation and one disc. Caxton recommends the user to make a backup copy of the disc. This is a necessity as Cardbox needs to write to the disc whilst in use. Even at this elementary stage the user may well have a problem. My initial thoughts about copying were to use the Diskcopy utility supplied with the PCW8256. However this proved of no use. I had to resort to using PIP (a CP/M command) in order to copy the files on the disc. All this may not be obvious to the user as the instructions in the entire Cardbox manual are written for micros in general rather than the Amstrad machine. A note explaining how to make backup copies should at least be included. Not a good start.

Having mastered this initial difficulty I set about initialising the software. This process informs the program the type of machine you are using, in order that it can output information in a format understood by the micro. Cardbox comes with two installation programs, TERMDEF and TERMGEN. The latter program allows the user to inform the program of control codes specific to his machine. Fortunately this is not necessary as Caxton supply a file with all the correct data for the PCW8256 or Amstrad micro, as appropriate. Initialising the program requires running the TERMDEF program and then entering the filename for the particular micro (ie PCW8256.DEF). This was a definite thumbs-up to Caxton, as there can be nothing more annoying than struggling to configure a program to your own computer's requirements. With this out of the way I was ready to start Cardbox.

Getting going

Running Cardbox is merely a matter of typing 'CARDBOX' from CP/M. The first screen you are presented with is the main menu and from here the user can access all functions connected with the database. The screen is split into two parts, where the top half shows the functions available to the user whilst the bottom half shows the functions the user has selected. The menu is further split into 'primary' and 'secondary' functions. Pressing either 'P' or 'S' moves an arrow down the lines of available functions.



The primary functions are Database, Format Definition and Operating System Utilities. The secondary functions indicated change, depending on the primary option chosen.

For example, if the Database option is chosen, then the screen shows four secondary choices – Use, Analyse, Create or Repair.

Getting to understand the complexities of a database can be a hit or miss affair and Caxton reduce this problem by providing an example file called 'Customer'. The learning process is further helped by the manual which is written with reference to manipulating this file. However it goes beyond a tutorial in that at a later stage the manual can be glanced at quickly for reference. Loading a file, as with all other commands in Cardbox, requires the user to press one (or two) of the keys on the qwerty keyboard. In this case the user presses 'F' for file. Generally there are prompts on the screen to remind the user of commands available at any stage.

Once a file is loaded, the screen displays the first record in the file. It is at this stage that you understand where Cardbox derives its name from. The screen shows a filing index card which is the equivalent of one complete record of information. As I'll explain later on, this index card can be designed to the user's own specific requirements.

Below the card are shown the commands available with the actual key entries highlighted in capitals (ie ADd, EDit, etc). These options contain the usual elements of database usage in that the user can add new information and edit and delete existing records. The cards (records) can be seen one at a time by going forward or backwards through the cards in the file. At first this is slow because each card is loaded into memory but once loaded the process is quicker.

Above the record card at the top of the screen are two lines of information detailing the file being used, the record being displayed, the number of records in that file and the level of use. The 'level' is an important concept to understand as it is at the root of the way a user selects information. The lowest level of use and the level presented initially is level 0. This shows that the user has made no choices as yet. As the user starts to search for a particular piece of information these levels are incremented by 1. Now if that sounds slightly confusing, it isn't as bad as it seems. In fact it makes understanding how you search for information a lot easier. Here's how it works.

Imagine that you have a cardbox full of index cards but you only want to select the cards which have the indexed word 'toys' on them and only those which are based in London. Finding these cards could be a slow process and you might sort them by first reducing the level of cards to those which show the town as London and then further reducing the cards to those that contain the word 'toys'. In effect this is the process that Cardbox carries out. Firstly the user would choose the SE option and type '/toys'. This tells the program to search for only those cards that contain the word 'toys' within any of the fields. On finding these cards – and it's fairly quick – the program displays the first card in that set of records. The display at the top of the machine informs the user that the card shown is 1 of, say, 22 such records. This is then the first level of the search.

The user then needs to narrow the search down to only those cards within 'London'. A similar process is used except this time the user informs Cardbox that the selection should be on only one field, in this case that relating to 'Town'. 'SE' is typed again but this time specifying 'TO/London'. This is then level 2 and the display might then show 'Record 1 of 8'. This in essence is how records are found. It's possible not only to 'SElect' cards with certain information but also to 'EXclude' information. Further still Cardbox can go back and 'INclude' information previously not defined. Cardbox will also undo a previous selection or undo them all.

In principle I like the thinking behind Cardbox. It's easy to understand and takes a relatively short time to use. But it does have its own perculiar way of utilising commands. The selection process previously described is easy but it does rely on the user remembering the name assigned to a particular field (ie TO for Town). This is not too much of a hassle so long as you remember to use sensible two-character codes when defining fields.

Setting up

Defining fields is an interesting experience as it involves first designing the layout of the record (index card) and then assigning the field names to each field. This part of the program, more than any other, impressed me as it became obvious that designing a record is a visual matter. Obviously the user must have an idea of what information he wishes to store and how it should appear to him on the screen.

Cardbox allows the user to 'draw' the index card and all its boxed sections (ie fields). The drawing part of the program uses the keys S, D, E, X for left, right, up and down respectively. It takes a little getting used to but I found that I could design a card very quickly. My only concern was that where a field demands a certain number of characters, the user is reduced to scrutinising the screen carefully in order to count characters. This is made more difficult as you need to remember the screen description that will take up part of the space. However, given the overall simplicity of the idea, the end result can be very satisfactory. There is also a facility to analyse the database a user has created in order to correct entries in design.

The program does have its limitations like all database packages. Each record holds up to 1,404 characters. But if you're intending to use this system it would not be a problem, as it is intended, as the name suggests, to hold index card information. There is a maximum of 26 fields per record. I managed to use this entire figure in my first application. You would do well to consider the nature of your information before using Cardbox. That piece of advice applies of course for any database package. There is no limitation on the number of indexed words (ie keywords used in a search) within a record or field. Each indexed word can be up to a maximum of 32 characters plus hyphens.

The theoretical maximum number of records that can be stored is 65,500 but this would depend on your external storage capacity. On the PCW8256 a second disc drive would be almost a necessity for applications using more than a couple of hundred records. Output to printer is naturally one of the options as well as dumping information into 'Wordstar' format. This option is especially appealing considering the popularity of the Wordstar program and its availability on CP/M.

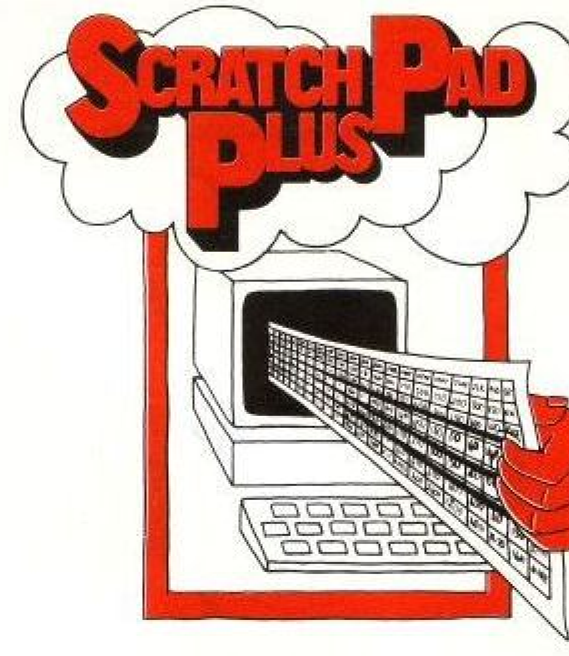
Conclusion

Annoying features were few in number and were in general due to the documentation making reference to usage on non-Amstrad machines. The most notable was reference to pressing the Esc key, which the PCW8256 doesn't have. Common sense suggested using the EXIT key and this solved the problem. There were other similar situations but these were overcome in a similar fashion.

Overall I was pleased with Cardbox. The reference manual with the exceptions noted was usable though by no means the last word in documentation. As a database it came out well in terms of ease of use and understanding of how data is stored. This can often cause problems and the presentation is good. However Cardbox is no heavyweight in the database market but then again it doesn't claim to be. Caxton call it a 'simple electronic card indexing system' and that's what it is. If your business demands a simple card index as a record keeping system, you could do a lot worse. A definite thumbs-up to Caxton Software!

ABC

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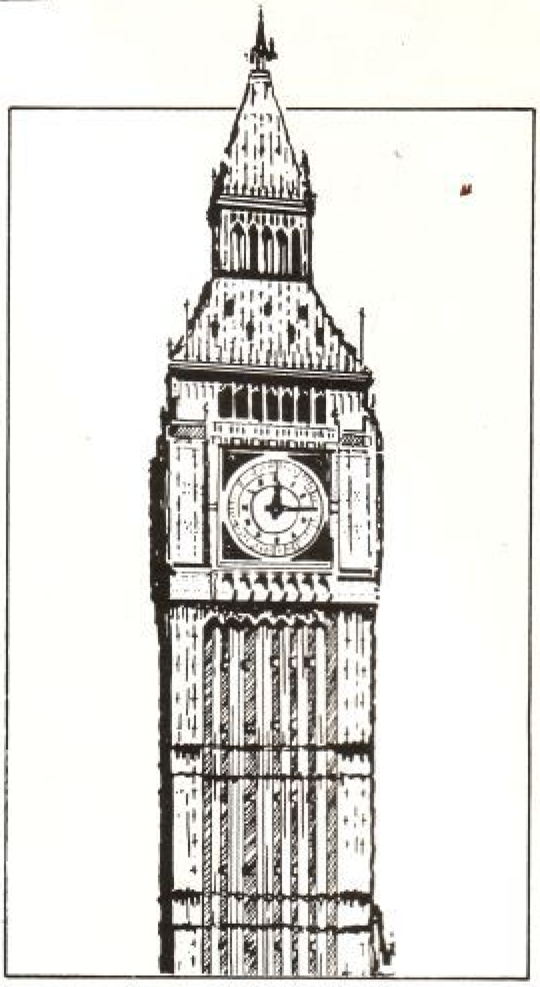
Very recently I and a number of my colleagues purchased your PCW8256, and already it has proved to be extremely useful.

It would be very helpful to be able to use the machine to hold data along the lines of the Master File 464.

Would this program run on the PCW8256, and if so, where can I obtain it? If not can you advise.

Norman Hogg MP,
Opposition Deputy Chief Whip,
House of Commons.

ABC: *Yes, Locoscript must be just the job for rewriting cabinet minutes, resignations etc. Master File 464, as its name implies has been written for the CPC464 and other CPC machines. It will not run under CP/M and therefore not on the 8256. A likely alternative would be Cardbox by Caxton but there may be other database packages that are just as suitable.*



The key to success

I, like thousands of others, am the proud owner of an Amstrad PCW8256, and am both greatly impressed and pleased.

In an effort to improve my typing speed and abilities I have recently purchased Caxton's Touch 'n 'Go from Newstar. This program is very good and I am quite pleased with it, but the exercises involving the numeric keypad do not work. This is not strictly correct, the keypad does work but you have to hold down the 'EXTRA' key all the time. This is a pain, particularly if you have to use the 'TAB' key as well.

For anyone who has, or is thinking of getting the Touch 'n 'Go there is a relatively simple solution. When you make your Touch 'n 'Go work disc take the opportunity to copy the J14CPM.EMS file onto it as well, along with the SETKEYS.COM and the SUBMIT.COM. Then, using the RPED facility create two files; the first called NUMKEYS or something similar. The file should look like the following:

```
79 N "."
01 N "0"
15 N "1"
07 N "2"
06 N "3"
13 N "4"
14 N "5"
05 N "6"
20 N "7"
12 N "8"
04 N "9"
```

The second file to be created must be called PROFILE.SUB and this should look like this:

SETKEYS NUMKEYS (or whatever name you choose)
T.COM

These two files should be copied along with the rest onto the Touch 'n 'Go work disc.

Now when the machine is switched on, it should load CP/M then set the keys and then load Touch 'n 'Go. The numeric keypad exercises can now be performed without having to hold down the 'EXTRA' key.

This may seem elementary to people who are used to CP/M but I am sure many people like me who have not met CP/M until they obtained a PCW, may find the above useful.

Finally, may I ask, do you know if there is anywhere that I can obtain an extension to the printer cable on the PCW. The shortness of the printer cable is its only fault.

I. Fletcher-Cook
Tetchill, Ellesmere, Shropshire

C-Basic

I was very interested to note the recent adverts from Digital Research regarding their new prices for certain packages, so I wrote away for C-Basic at once.

I have not yet had C-Basic long enough to get far into it, but I have had a chance to try some comparative timings – to see how the compiled Basic compared with Mallard Basic as supplied on my PCW8256. The results are rather interes-

ting, especially in the light of the claim by DR that "C-Basic Compiler combines the speed of machine code with the ease of use of the Basic language. A program executes from eight to ten times faster than the same interpreted program", viz:

Personal Computer World Benchmarks

Benchmark No.	Mallard Basic(secs)	C-Basic(sec)
1	1.1	4.2
2	3.8	4.3
3	9.9	20.2
4	10.1	31.1
5	11.0	31.1
6	19.1	57.3
7	30.3	62.0
8	33.9	10½ minutes

Hm. A very strange set of results I don't know if the problem is that Mallard Basic is so fast, or just that compiled C-Basic is certainly not fast, but the obvious conclusion is that compiled C-Basic is far slower than Mallard Basic. In some cases, painfully slow. No doubt, the source code could be rewritten to reduce the difference, but the same rewrite would probably improve the timings for Mallard Basic too (such as defining all numeric variables as integers). This is not really the point, though, as anyone buying C-Basic would be looking for improved performance on their existing programs.

Please note, I'm not complaining. Considering the price (compared to the usual cost of this C-Basic package), I'm quite happy. I note the following advantages over Mallard Basic:

1. Any programs can use all the 61k TPA under CP/M, and even allowing for the overhead on your code imposed by the standard routines added during compilation, this is far better than the 31k available under Mallard Basic.
2. C-Basic includes multi-line functions, working in a similar way to BBC Basic Def Proc commands with passed parameters and local variables.
3. C-Basic gives you GSX graphics capability, even if a couple of the commands do not work on the PCW screen (ie, large characters and rotated text).
4. C-Basic allows the compilation of source code greater than available RAM, with the inclusion of library routines, and use of overlays as well as chaining.
5. The compiler seems quite happy with most MBasic code as source, hence also works with Mallard Basic code assuming you check the code for non-allowable commands and save to an ASCII file.
6. Once a program is compiled, it can be run directly under CP/M, without having to load Basic. Also possible would be chaining directly to one of the CP/M utilities, or running a Basic program from within a set of Submit file commands.

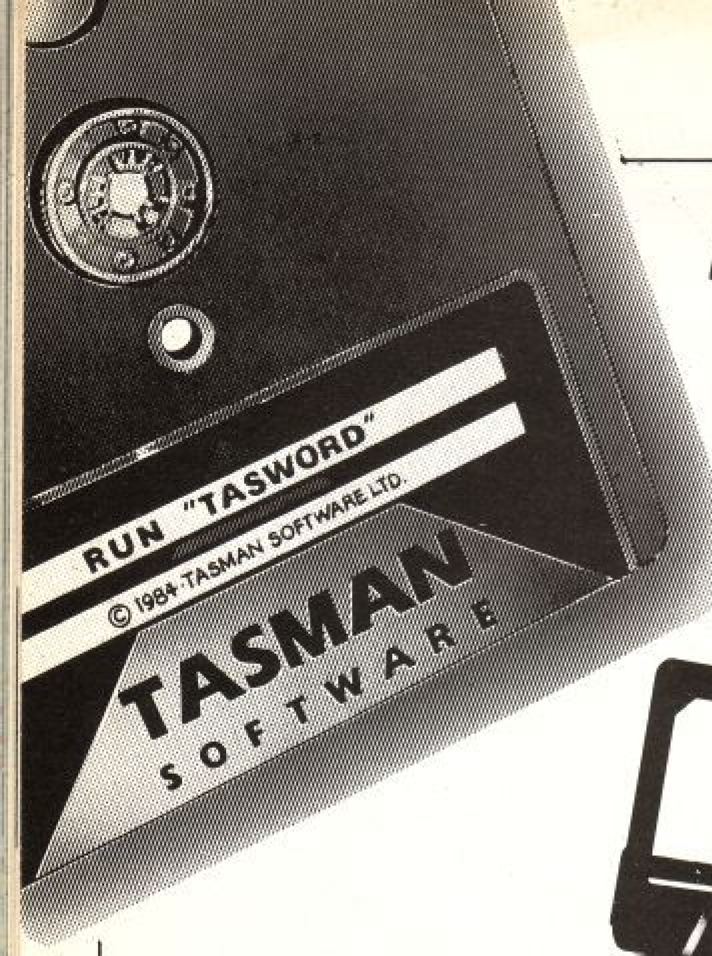
The disadvantages are:

1. You lose the Jetsam filing commands. While C-Basic does still support random files, the system is not so 'clever' as under Mallard Basic (although to be fair it is a little more flexible).
2. You no longer have the advantages of an interpreter for editing, running and debugging your program.
3. C-Basic would appear to be *slow* for an interpreted Basic, which must rate it as snail-like for a compiled program.

In conclusion, there's still, I feel, a lot of value in the package – it's just rather a pity that it is nowhere near 'fast'. Does anybody know why?

Geoff Barnard,
Guisborough,
Cleveland.

ABC: *Thank you for this letter Mr Barnard. I think many PCW users will be interested in your appraisal of the relative merits of the two Basics.*



THINKING THINK



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TASWORD 6128 for the Amstrad CPC 6128 disc £24.95

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AMSTRAD ACTION
December 1985.

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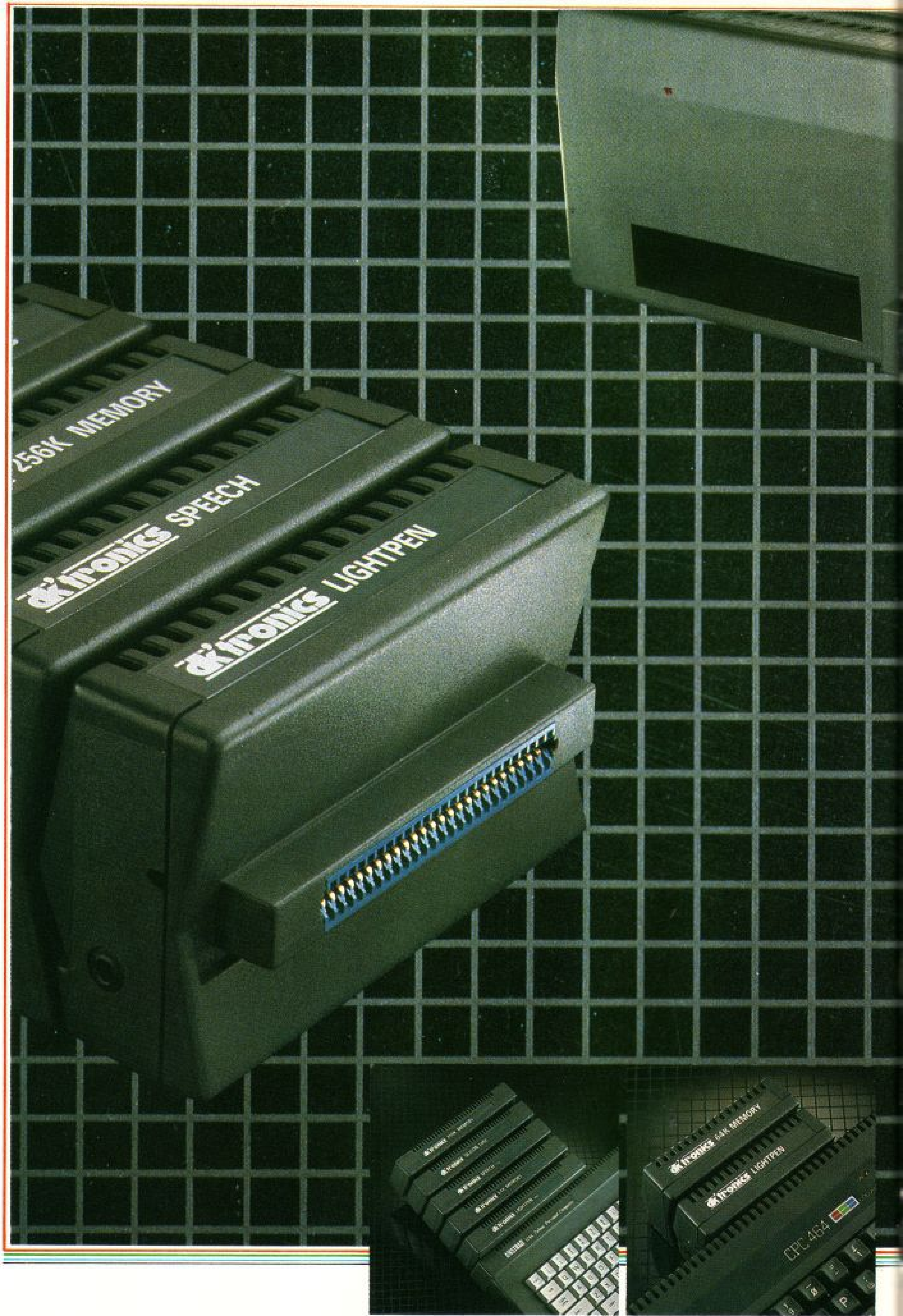
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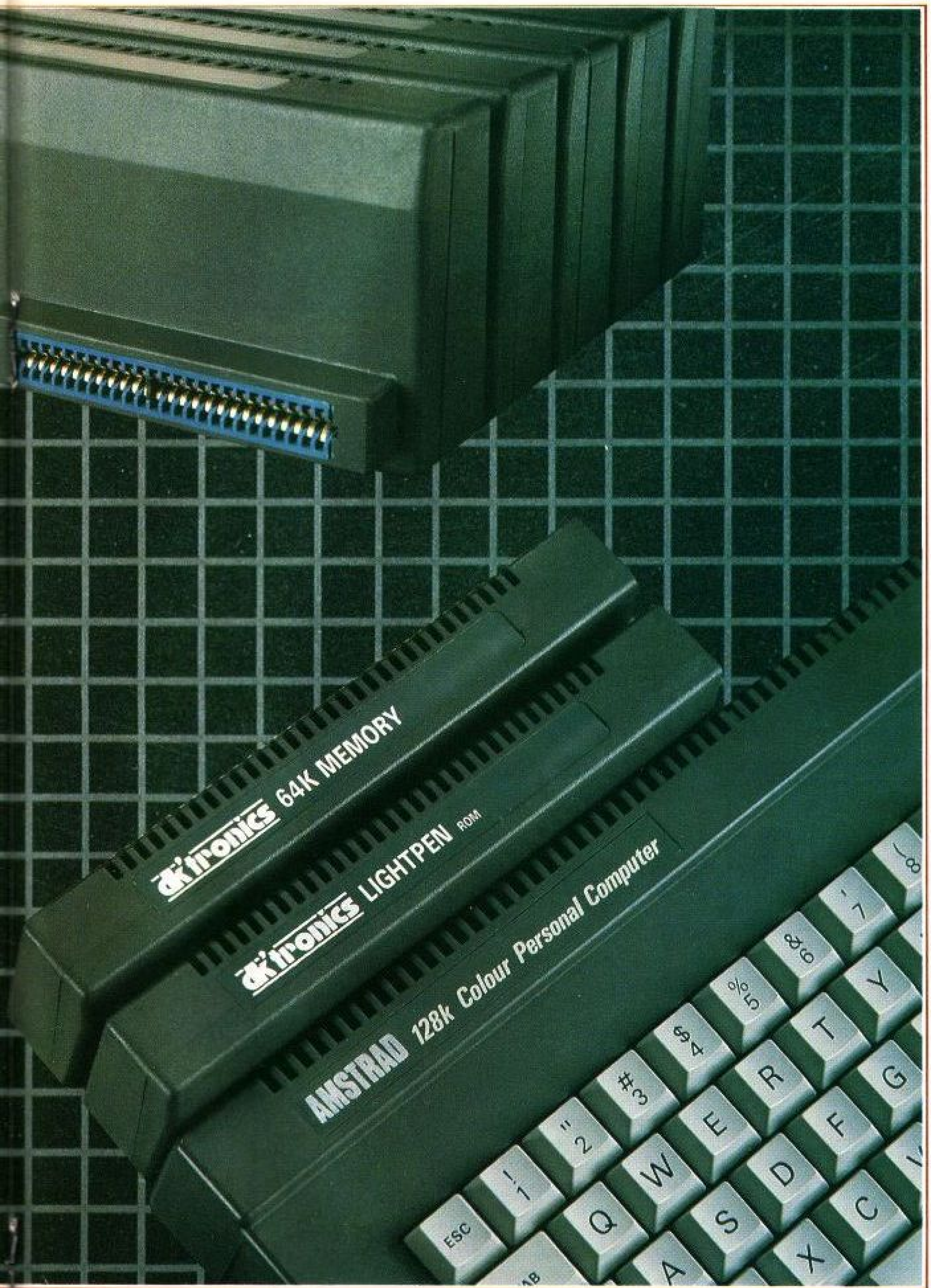
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It is supplied with bank switching software in the form of RSXs to use the memory as storage for screens, windows, arrays and variables. The 250K can store 16 full 16K screens.

It allows the use of CPM plus as supplied with the 6128.

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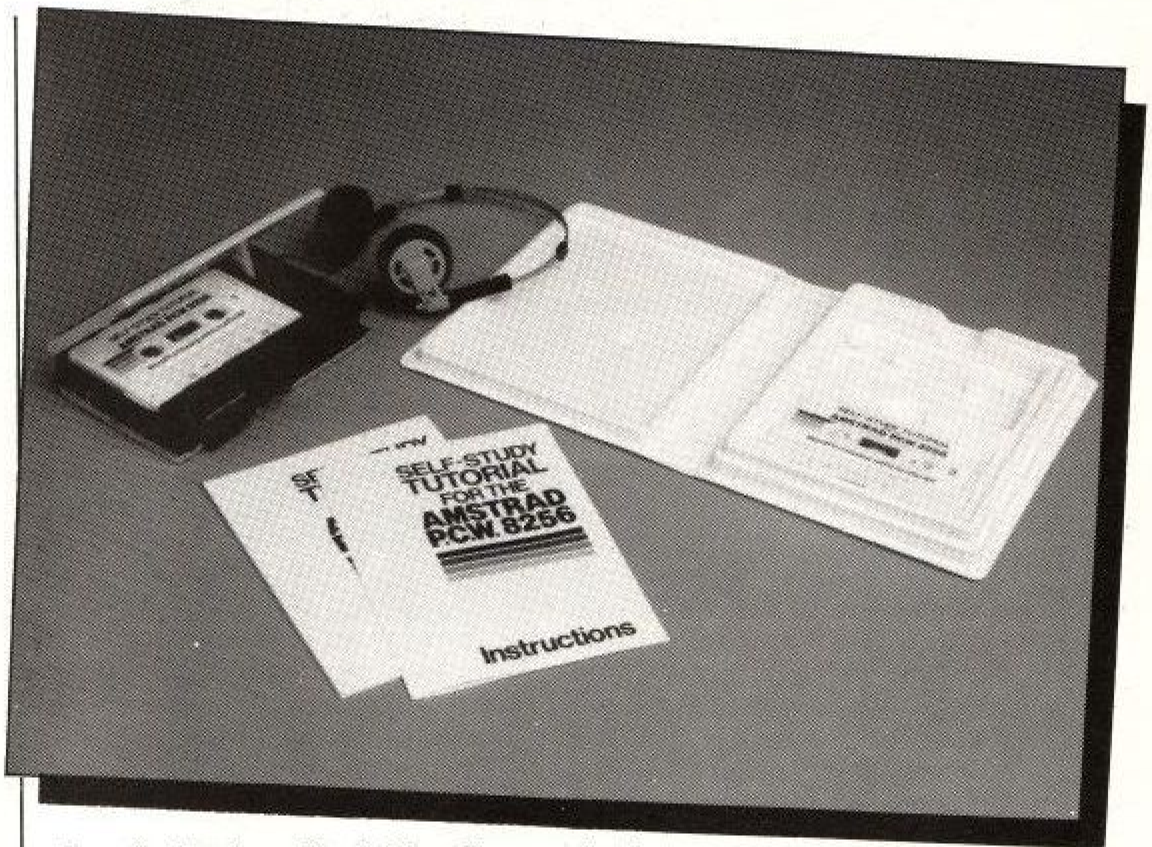
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ABC
REVIEW



LocoScript from Head-Line Communications

Listen with LocoScript

An audio tape could be the answer for novice Joyce users who are having problems with LocoScript. Sue Maybee dons the headphones.

The PCW8256 has made available to a new section of the public a powerful word processing system. This section of the public has no experience of using even an electronic typewriter, let alone a word processor, and is struggling to learn all about it from a manual.

In pre-Joyce times the only members of society using word processors were those professionally trained to do so, now is the post-Joyce era and anyone with £399 plus VAT to spare has, potentially, a whole new world opened up to them.

To the initiate, a word processing system can be a strange beast; and to someone who is not even aware of the meaning of typing terms like "justify", "proportional spacing", "pitch", or "line spacing" the beast must appear even more strange and untameable.

To the rescue

To help these poor souls Head-Line Communications Limited have put together an audio self tutorial package specifically for the 8256 and LocoScript.

For some time the value and use of audio systems of learning has been known, schools and colleges make available audio tutorial packages for many subjects including languages, Open University has been using radio to teach degree subjects, even the forces use audio methods in their "free running courses". Of course "talk and chalk" cannot be replaced by this method of teaching, but it is a useful tool, especially when supplementing written instructions, in this particular case, the PCW8256 User Guide.

Head-Line Communications have put together this package "Wordprocessing with LocoScript" very neatly. It consists of four sessions contained on two audio cassette tapes, an instruction leaflet and Quick Reference Guide to LocoScript which can be used when you have finished the sessions.

Session one starts off well with a good introduction, and makes it clear that a working copy needs to be made of the master disc, one of the major initial problems for new users of Joyce, judging

from the letters and phone calls received by the Customer Services Department at Amstrad.

Once the need to copy the master is established the learner then has a problem trying to follow the Disckit procedure as described in the Manual, so the concise instructions given in the Instructions leaflet with this package will help the novice a great deal, and Head-Line is performing a great service by helping alleviate the pressure on the busy switchboard at Amstrad.

Beginners only

In no way does Head-Line claim to be able to create an expert WP operator in four sessions, but states plainly that its aims are to make the listener competent in the WP operations he is most likely to need in his every-day work. It has not been assumed that the listener is a typist or is even familiar with the PCW keyboard, and describes where a key is when the listener is first asked to use it. This works well as a device to allow the listener to keep up with the instructions on the tape without having to stop the tape and break the flow, which would be distracting to say the least. Bleep signals are given to mark the points where the listener should turn off the tape and practice the operations.

As the sessions progress and the beast is slowly tamed the tape still gives complete explanations of every operation so the tamer is able to get the feel of working at a fairly normal, even, pace (getting used to having the whip in his hand!) not having to keep referring back to previous parts of the tape or to the user guide whilst in the middle of a new trick. I was pleased to note that the package covers organisation of work. It is an aspect of word processing that the novice might well overlook, particularly in the early stages, and cause problems later on when there is a large volume of work which needs re-organising. If the user can start good word processing/housekeeping habits early on, as in any field, it makes life a lot easier later.

Head-Line Communications have produced a package which will help many to come to grips with the basic elements of LocoScript. For anyone with a previous knowledge of word processing the sessions might seem slow, but for the raw recruit they should help make the experience of learning a little less daunting.

Filling the gap

Because the PCW8256 has put word processing well within the reach of many who must have regarded it previously as rather mysterious, audio sessions like this will fill the gap in the market between the manual and the training courses which are available. Disadvantages with this type of learning are really the same as any that do not involve a personal interaction with the teacher, but there is always the manual to fall back on, and failing this, the Customer Services Department has become used to dealing with the panicking ranks of the word processing army of raw recruits!

Conclusion

In conclusion, a nicely arranged package, easy to follow. It does not cover the more involved operations with LocoScript but will be a good starting point for those experiencing learning difficulties with their Joyce.

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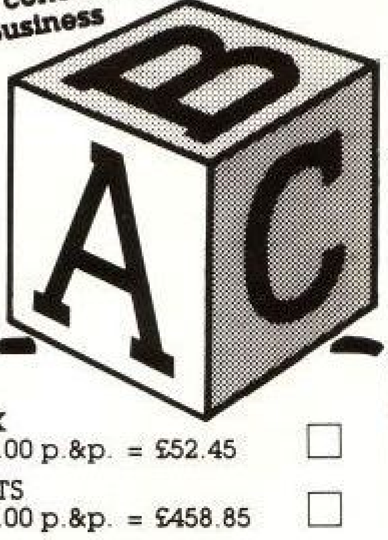
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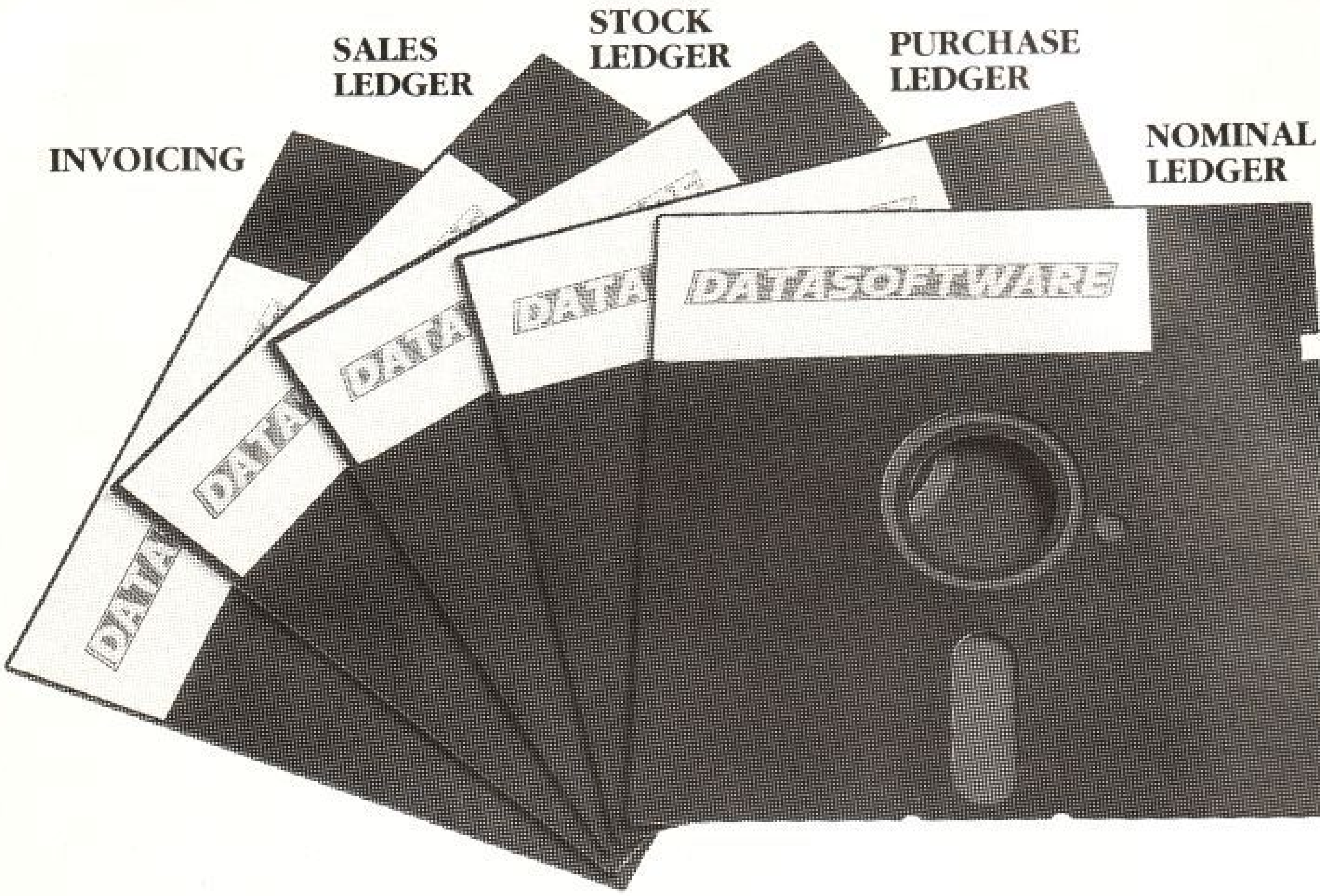
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ABC SPECIAL

GSXplained

GSX stands for Graphics System eXtension. It adds graphics facilities to the CP/M family of operating systems and provides a machine independant interface for applications programs. GSX-80 is the version for Z80 machines such as the Amstrad and is supplied as standard with the CPC6128 and PCW8256 computers.

Very little documentation is available about GSX and so, not surprisingly, very little software has actually been written which use the extra functions supplied. This is starting to change and some software houses are now starting to use GSX seriously, but for the time being the only commercial software available that uses it has been written by Digital Research, the inventors of GSX and CP/M.

It is not in the scope of this review to explain in depth how GSX works or what calls to make – that should be the topic for a future 'how to . . .' article – but a brief explanation of the theory of operation of GSX is in order.

The 'core' of GSX is standard for all machines, the only machine dependant parts required are the 'device drivers' which interface the GSX system with the computer. Device drivers are supplied with the CPC6128 and PCW8256 computers to cover a range of available screen modes, printers and plotters.

Mapping things out

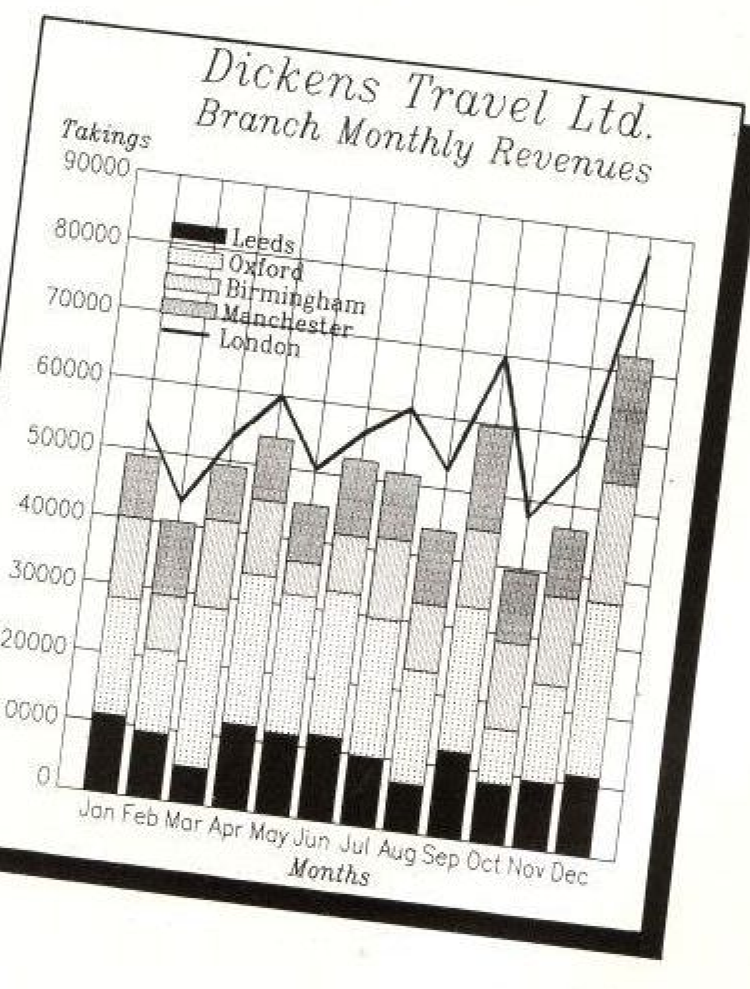
In GSX every device is treated as being the same size. Both the x and y axes are considered to have a range of 0-32767 – called Normalised Device Coordinates (NDCs). When a device (workstation in GSXspeak) is opened values returned by the machine specific device-driver selected are used to calculate the number of NDCs to each physical pixel supported by the device.

The upshot of all this is that the graphic image stored always is held at maximum size and then scaled down to give the best fit for the selected device. This means there is less visible distortion when displaying the graphic images on higher resolution devices. It also means that it will try to print the fancy fonts on the screen and so pass the 'stand 3 feet away and squint' test.

Digital Research have now released three programs on Amstrad format discs which use GSX. These are: DR Graph, DR Draw and the CBasic Compiler, all priced at £49.95 and available via dealers or directly from Digital Research.

DR Graph

DR Graph is a business graphics program which allows the production of professional graphs and charts. It is probably the most robust of the DR programs reviewed here, having been ported across



from generic CP/M-80 8in discs to the 3in Amstrad format early last summer to test GSX on the then prototype CPC6128.

It is a very large and complex program and 6128 owners will need to split the modules over two discs if they have a two drive system or both sides of one disc on single disc systems. Joyce owners will be able to gain some advantage by using the RAM disc to store the most frequently used modules.

The program is driven completely by menus and, once set up, is suitable for operation by non-technical personnel. It comes complete with a fairly comprehensive but generic manual so that some references, to color (sic) for example, may not be valid. Every menu which the user will be faced with when operating the program is explained in detail with examples given where necessary.

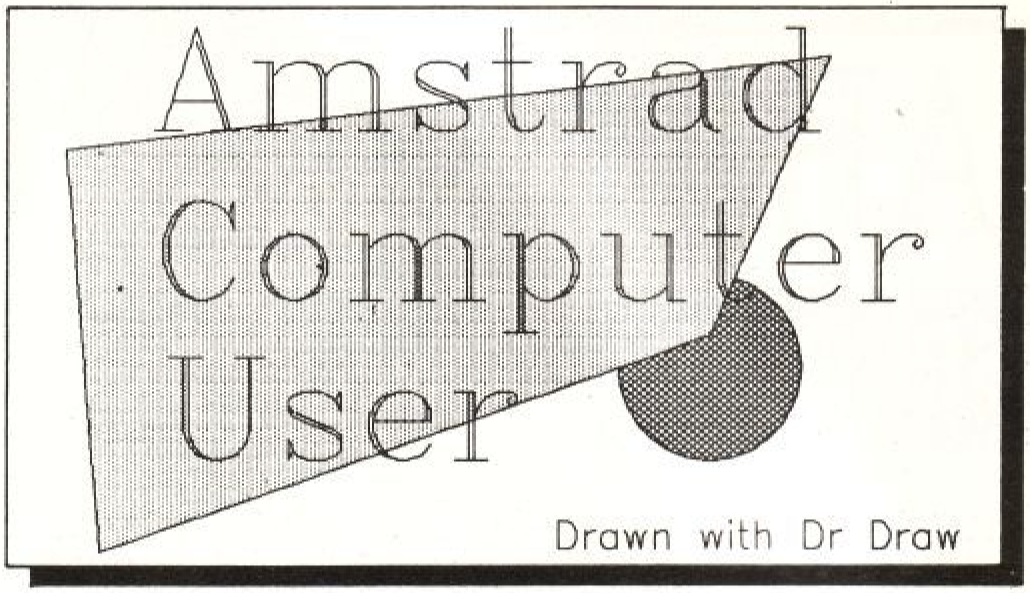
The program can handle three main types of chart:-

- X-Y axis graphs which can handle up to five columns of data each of which can be 75 elements long. Each or all of the columns can be represented by combinations of five types: Lines, steps, sticks, scattered or bars (clustered or stacked).
- Pie charts of up to 12 segments, any of which can be 'exploded' from the main body of the pie. Segments of the pie can be displayed with the actual values or as percentages of the whole and also sorted into ascending or descending order.
- Text only charts. This may seem like a non-option but can be very useful because as well as the standard font – the characters that are displayed on your machine normally – there are three other fonts available: Simplex Roman, Duplex Roman and Complex Italic, each of which can be displayed in any size required. These fonts are also available in the line and pie charts described above.

The design elements of the charts – titles, labels, borders, colours etc – are totally under the control of the user from easy-to-use menus. Graphs can also be easily annotated directly on the screen.

Typing in data can be a bit of a bore, so DR Graph has an option to read files produced by the popular Visicalc and Supercalc spreadsheet programs. With Supercalc the spreadsheet file must be modified by using the Super Data Interchange (SDI) program supplied with Supercalc to an .SDF type file, this is then loaded directly giving the user the chance to select the rows or columns of data required.

There is a slight lack of thought here because the filetype must be specified as FILENAME.SDF. Only 12 characters are allowed for the filename, which means that a drive prefix cannot be included so the file must be stored on the default drive. This is my only quibble with the product apart from the slow running speed inherent in a complicated modular program.



Drawn with Dr Draw

DR Draw

DR Draw is a design package which allows easy creation of visual aids, pictures etc. The program is easy to operate, most functions being carried out by use of the cursor keys, space bar and return key. These keys work in much the same way as a mouse on a WIMP system. The cursor keys obviously move the cross-hair graphics cursor around the drawing area, the space bar selects a menu option or a position on the 'canvas' and the Return key completes an operation. At the top of the screen are two bars which contain menu options, the lower bar giving sub-options when an option on the top menu bar is selected or operational prompts for the user.

A DR Draw picture is made up of a number of elements which can be either textual or graphical. Individual elements can be selected or changed at will. The size, colour, line-style – even the relative position to other elements – can be easily modified.

A text element can be in one of three current fonts (not including the machine font) out of a total of eight fonts supplied with the package. In the generic CP/M-80 DR Draw there are actually 12 fonts but four seem to have been sacrificed to allow DR to only ship one disc with each pack. But to be fair three of the axed fonts are Greek and the fourth a very fiddly script which rarely looked good anyway so the loss is not that great.

Graphic elements can be bars, circles, arcs, lines, markers or polygons. Closed figures such as polygons, bars and circles can be left as lines or filled with one of 14 fill types.

The program comes complete with a very good, generic manual which clearly explains all the available options. Finished artwork can then be displayed on the screen, printer or plotter without detracting from your masterpiece by showing the menu bars or grid positions.

CBasic compiler

The CBasic compiler is a very powerful Basic compiler. There is only room here to gloss over the surface of such a complex package. CBasic has two distinct advantages for the serious software writer, it produces directly executable COM files for execution in CP/M with all the speed and source-code protection advantages of a compiler, and also direct access to the GSX graphics capability.

CBasic source code is totally portable between machines that support it. It has most of the features of the Basic language, and then some – 14 digit precision arithmetic, multiple line functions, random-access files, even some commands which directly emulate BDOS functions. The structured programming brigade (platoon?) will love the fact that line numbers are not used and that the widely (mis-)used GOTO (and GOSUB for that matter) command can only divert execution to a label within the program.

To use the compiler you will need an Ascii text file generator such as Wordstar, Newword, Protext or the like to produce the source code because a line editor is not included. The package comes complete with three (yes three) manuals: The programming guide covering the compilation and linking process, the Reference manual covering the definition of the language and the Graphics guide covering the Graphics extensions supported.

All in all these three packages will lend further weight to the cheaper software movement. Whether you actually use them as tools or just executive toys the graphic packages are fun to play with and help to while away the hours between audits.

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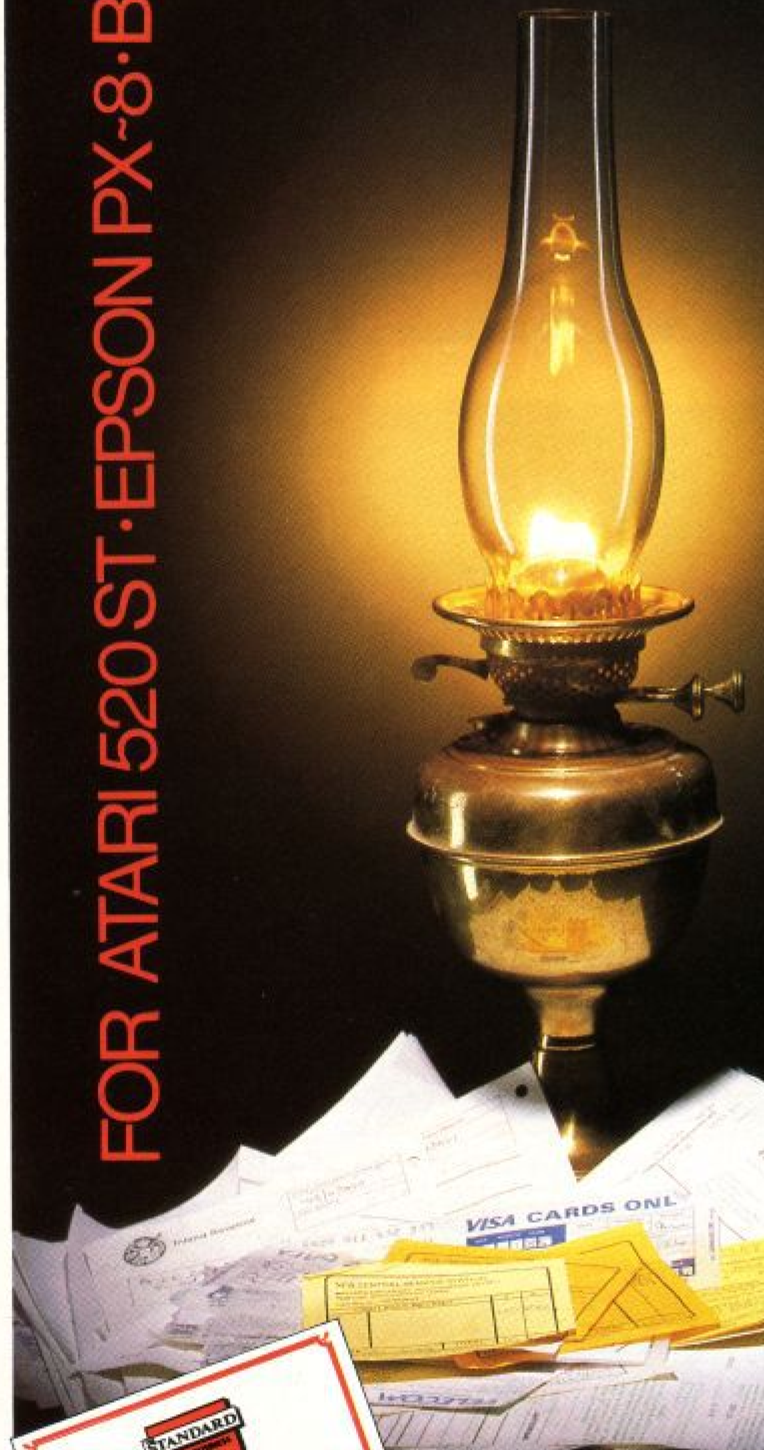
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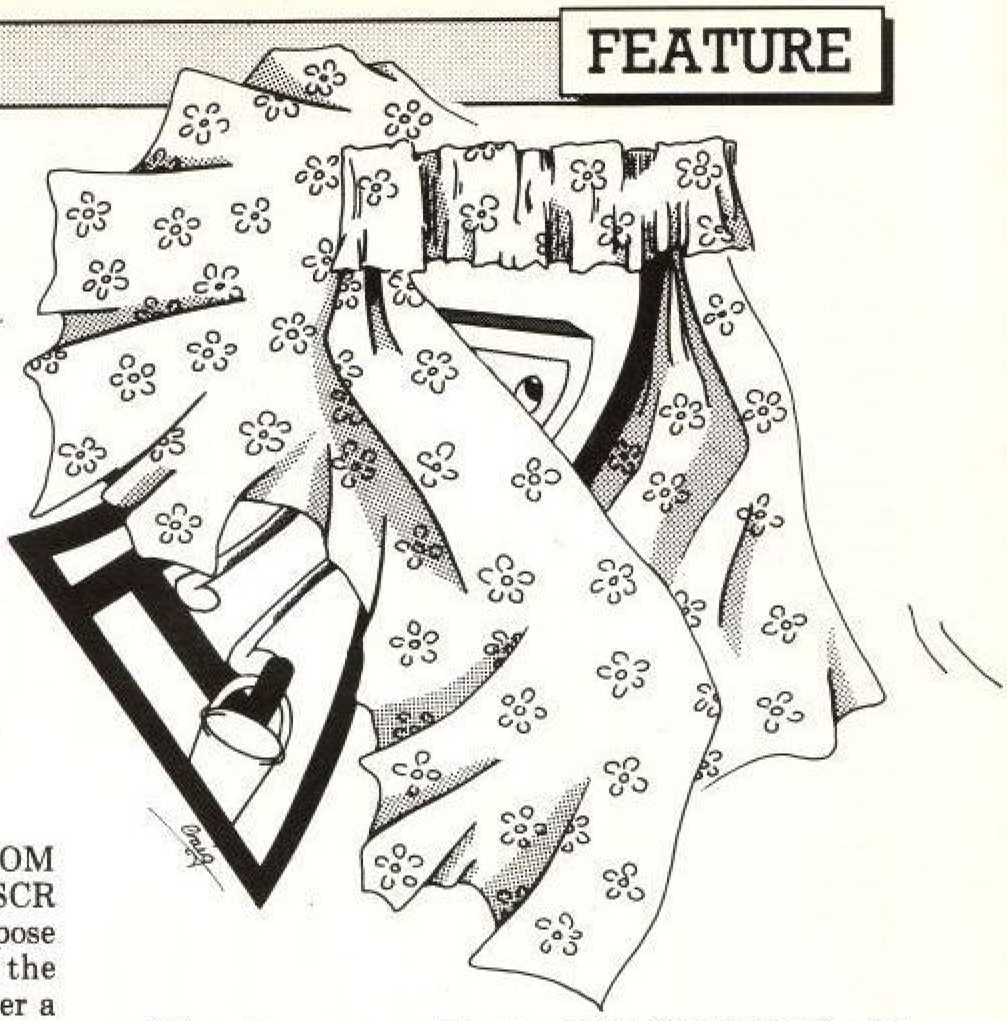
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Twistin' and a-turnin'



Richard Sargent continues his look at screen manipulation and flips.

Last month we ended with a quick look at the two ROM routines SCR CHAR POSITION (&BC1A) and SCR DOT POSITION (&BC1D). These are general-purpose translation routines which are very useful to the machine-code programmer, since they accept either a character-screen coordinate or a graphics-screen coordinate and produce a 16-bit number pointing to a precise VDU RAM location. Routines like these simplify the code needed in programs which investigate portions of the screen, or which exchange sections of screen between VDU RAM and free RAM. Free RAM in this context is RAM which is above Basic and which is also not in danger of being over-written by the command SYMBOL AFTER or by tape/disc-file operations. Before writing any routines this month, careful consideration must be given to their location within the free RAM – with quantities of screen-bytes moving around, some important code could easily get scrambled!

Room to experiment

You'll find that on a 464 or 664 the only sizeable chunk of memory available for storing screen-bytes is the 20k area from &4000 to &8FFF. This amount of space is sufficient for an entire alternate screen of 16k to be stored at &4000-&7FFF and for a quarter-screen portion to be stored at &8000-&8FFF. The code required to manipulate the screen can therefore start at &9000 but it must finish at about &92F0 since at this location the tape and disc files begin, followed closely by the user-defined-graphics area.

Those readers familiar with the CPC6128 will probably already know that this machine has a SCREENCOPY RSX routine on disc, and that the extra 64k of banked memory can hold four alternate screens. A screen can be swopped around in half-a-second, and, since the memory contents at &4000-&7FFF is not disrupted by the move, HIMEM doesn't need to be moved right down to &3FFF. CPC6128 users should be delighted to have this extra facility, but, just for this episode of the screen-manipulation series, they're being asked to pretend their machine hasn't got that additional 64k.

Character squares

The first three routines this month are concerned with manipulating the information in character squares. The useful routine possessed by the 6128, COPYCHR$, will be introduced to CPC464 users, but the D-I-Y version COPYCHAR presented here is not quite the same as the one which resides in the 6128 Basic.

COPYCHAR

COPYCHAR is a machine-code routine called from Basic which looks at a screen location and reads the character found there in a pre-declared string variable. The new command, in its simplest form, takes the syntax A$="0":CALL &90B4,@A$. On the 6128 there is no need to declare the variable in advance, but the screen channel must be given and it is the current cursor position for that channel which is read. The following 6128 program segment reads the character at column 1, row 1 and prints it at column 8, row 3. The original character is not altered, and of course there is no obligation to reprint it (copy it) if you don't want to.

```
LOCATE 1,1:A$=COPYCHR$(#0):LOCATE 8,3:PRINT A$;
```

For the 464, the same task is accomplished by:

```
LOCATE 1,1:A$="0":CALL &xxxx,CHAN,@A$:LOCATE 8,3:PRINT A$;
```

Figure 1 shows the assembly listing for a simple version of COPYCHAR which doesn't even bother with channel

```
;COPYCHAR SHORT SOURCE
;REGISTER DE HOLDS THE INFO' RELATING TO THE @A$ PARAMETER
;THE PARAMETER IS A STRING, SO DE POINTS TO 3-BYTE STRING DESCRIPTOR
;DE IS ACTUALLY POINTING TO THE "LENGTH OF STRING" BYTE
;WE WANT THE ADDRESS OF THE STRING, SO STEP DE ON ONE PLACE...

ORG &90B4

13      INC DE     ;AND POINT TO LSB OF THE ADDRESS
1A      LD A,(DE)  ;ADDRESS VALUE IS
6F      LD L,A     ;BEING PASSED TO HL, LSB FIRST
13      INC DE     ;NOW POINT TO MSB
1A      LD A,(DE)  ;
67      LD H,A     ;ADDRESS NOW IN HL
CD60BB  CALL &BB60;READ CHARACTER AT CURRENT CURSOR LOCATION
77      LD (HL),A  ;AND PUT RESULT INTO THE STRING
C9      RET        ;RETURN TO Basic WITH BRAND-NEW A$ !
```

Figure 1/Listing 1

numbers. The code is relocatable, so it can go anywhere that's convenient.

However, COPYCHAR can be expanded beyond this simple version and some of the alternative arrangements which can be constructed offer the programmer some special effects. The first proposed change to COPYCHAR is to allow it to accept screen column and row coordinates, but to limit its operations to the current screen channel. This gives the format: A$="0":CALL &9000,C,R,@A$ and the current cursor position is unaffected until such time as A$ is copied by a PRINT command. So far so good, but there is a complication. The versions of COPYCHAR which are easiest to code use a ROM routine called TXT RD CHAR at &BB60 (Read a Character from the Text screen) and this routine is not infallible. The read is performed by comparing the matrix found on the screen with the matrices used to generate the characters. The problem is that the screen matrix can become altered in ways which will baffle the computer. One innocent way to muddle the screen matrix is to change paper and/or pen inks – the character may look the same but the bits in the screen bytes have undergone some transformations to encode the new colours. TXT RD CHAR will attempt to unscramble the colours, but success is not guaranteed. The colour-decoded screen matrix is compared with the character matrix held in ROM and/or RAM, where Amstrad have defined 256 characters. The RAM UDGs are recognised. Failure to match with one of these causes TXT RD CHAR to generate a "carry false" flag and the routine COPYCHAR is left holding a null string. If the character is offset within its character square (as it might be if it was printed to the graphics screen using TAG) then it can't be recognised. If the character has a graphics line or point plotted on it then again it can't be recognised, even if it's sitting squarely in its character square.

Delving deeper

TXT RD CHAR is a fairly high-level ROM routine with the intelligence to try colour combinations when attempting to read a character. In the section of the ROM which deals with screen-handling there are two low-level routines called SCR UNPACK (&BC53) and SCR REPACK (&BC56) and they actually deal with the difficult task of moving bits and bytes from the character matrix to the screen matrix and vice versa. SCR REPACK is particularly interesting since it is used by TXT RD CHAR to compress a screen matrix, which is 32 bytes in size for a Mode 0 character and 16 bytes in Mode 1, to the standard character matrix which is always 8 bytes in size. Obviously SCR REPACK can't cope with sorting out a multitude of paper and pen inks either (or else TXT RD CHAR would be more successful), but what it can do is build up a character matrix in 8 bytes of RAM to which the programmer has full access. From there it can (if you so wish) be expanded back into a screen matrix using SCR UNPACK (and some additional code) at a different VDU location. The advantages of having a screen character residing even temporarily in 8 contiguous bytes of RAM are substantial as we shall see later.

Returning to COPYCHAR, four versions are presented here, and each will run on any CPC computer. For reasons which will become apparent later, the @A$ parameter is no longer needed.

CALL &9000,0,COL,ROW is the version which provides its own screen coordinates, in which case the current cursor position is left untouched (which is usually most helpful.) The significance of the zero (the third parameter) will be explained shortly.

```
CALL &9000,@C%(8),@C%(7),@C%(6),@C%(5),@C%(4),
@C%(3),@C%(2),@C%(1),0,COL,ROW
```

is the long command of COPYCHAR version two. The integer array C(x) accepts the value of each byte in the compressed character matrix, and a subsequent printing of C(x) allows the screen character to be viewed easily in BIN format, and incorporated into a SYMBOL statement. The Basic program to do this is shown in figure 2/listing 2. The machine-code routine for the fully-fledged COPYCHAR runs to some 200 bytes because the code includes other features yet to be described.

```
100 REM INVESTIGATING THE MATRIX OF A ROTATED LETTER "A"
110 FOR X=1 to 8:A%(X)=0:NEXT :REM Declare the variables.
120 CLS:LOCATE 2,2:PRINT "A"  :REM Print the A
130 CALL &9000,@A%(8),@A%(7),@A%(6),@A%(5),@A%(4),@A%(3),@A%(2),@A%(1),0,2,2
140 LOCATE 1,5:PRINT CHR$(255):PRINT
140 FOR X=1 to 8:PRINT BIN$(A%(X),8):NEXT:PRINT
150 FOR X=1 to 8:PRINT A%(X);:NEXT:PRINT

-----------------------------------------------------------------------
```

Figure 2/Listing 2

Rotate

Rotate is a machine-code extension of COPYCHAR which turns a character around on the screen, so that for example, a letter or number may be placed on its side and used to label the Y-axis of a graph. User-defined-graphic may also benefit from being rotated. The ideal rotate routine can be considered as a number of defined stages, in which ROM routines occasionally do some of the hard work:

1. Save the current cursor position. ;TXT GET CURSOR
2. Obtain location of character to be rotated. ;TXT RD CHAR
3. Pack character into RAM. ;SCR REPACK
4. Rotate character in RAM 90, 180 or 270 degrees.
5. Unpack character back into VDU-RAM. ;SCR UNPACK
6. Restore cursor position. ;TXT SET CURSOR

The five ROM calls don't tell the whole story. SCR REPACK, for example, likes to know the pen ink colour for the current stream, coded to suit the prevailing screen mode. A call to TXT GET PEN (&BB93) followed immediately by a call to SCR INK ENCODE (&BC2C) finds this information. The main problem, though, is that SCR UNPACK doesn't actually place the bits and bytes back onto the screen – it has to be aided and abetted by some extra machine code which turns out to be unreasonably long when asked to cope with modes 0 and 1. However, two tricks can circumvent the length problem. One is to take UDG number 255 out of general use and use it exclusively for rotation-duties, and the other is to make the rotation command share the

COPYCHAR syntax. The rotation routine now becomes:

1. Save the current cursor position. ;TXT GET CURSOR
2. Obtain location of character to be rotated. ;TXT RD CHAR
3. Pack character into UDG 255 RAM. ;SCR REPACK
4. Rotate character in RAM 90, 180 or 270 degrees.
5. Write UDG 255 to required location.
6. Restore cursor position. ;TXT SET CURSOR

The extra ROM routine required in this version is TXT GET MATRIX (&BBA5), which finds the address of UDG 255 (as required by SCR REPACK). The Basic syntax of the new command (the third version of COPYCHAR) is CALL &9000,N,COL,ROW where N is a number 1, 2 or 3 replacing the zero third-parameter. The numbers simply indicate how many 90-degree rotations are required. COL and ROW are, as usual, the coordinates where the character is to be found, and it is actually rotated on the screen as well as being loaded into UDG 255. As with COPYCHAR version one, rather than show the entire coding, the principles at work are illustrated in the source of listing 3/figure 3 so that the points of interaction between the Basic and machine-code can be seen.

```
;ROTATE : EXAMPLE CODE

 CALL &BB78    ;TXT_GET_CURSOR KNOWS THE CURRENT SCREEN
               CO-ORDINATES.
LD (OLD),HL   ;SAVE THEM
LD L,(IX+0)   ;OBTAIN NEW LOCATION FROM ROW PARAMETER.
LD H,(IX+2)   ;OBTAIN NEW LOCATION FROM COL PARAMETER.
PUSH HL
CALL &BB75    ;TXT SET CURSOR
POP HL
PUSH HL
DEC L
DEC H
CALL &BB93    ;TXT GET PEN (CURRENT FOREGROUND INK)
CALL &BC2C    ;SCR INK ENCODE (ENCODE IT)
PUSH AF
LD A,255
CALL &BBA5    ;TXT GET MATRIX (GET ADDRESS OF UDG 255)
LD (UDG),HL   ;SAVE THE ADDRESS FOR LATER
EX DE,HL
POP AF
POP HL

 CALL &BC56    ;SCR REPACK (PACK SCREEN-CHARACTER INTO UDG 255)
 LD B,(IX+4)   ;NUMBER OF ROTATIONS REQUIRED (FROM NUM PARAMETER)
 L1:CALL ROTATE ;CALL ROTATE B TIMES
 DJNZ L1
 POP HL        ;NEW LOCATION BACK IN HL
 CALL &BB75    ;TXT SET CURSOR : PREPARE TO PRINT
 LD A,255      ;CONTAINS THE ROTATED CHARACTER
 CALL &BB5D    ;TXT WR CHAR : PRINT IT!
 LD HL,(OLD)   ;RECOVER OLD CURSOR CO-ORDINATE
 CALL &BB75    ;TXT SET CURSOR (POINT CURSOR TO IT)
 RET           ;RETURN TO Basic

 OLD:DS 2
```

Figure 3/Listing 3

```
40 MEMORY &7893
50 RESTORE 900
70 FOR a=&9000 TO &9147
80 READ A$:POKE A,VAL("&"+A$):NEXT
90 END
900 DATA FE,03,D8,F5,CD,78,BB,22,80,90,DD
    ,6E,00,DD,66,02,E5,CD,75,BB,E1,E5,2D
901 DATA 25,E5,CD,93,BB,CD,2C,BC,F5,3E,FF
    ,CD,A5,BB,22,82,90,EB,F1,E1,CD,56,BC
902 DATA DD,7E,04,47,B7,C4,8F,90,E1,CD,75
    ,BB,F1,FE,05,30,33,FE,04,28,0F,DD,7E
903 DATA 04,B7,3E,FF,C4,5D,BB,2A,80,90,C3
    ,75,BB,3E,FE,CD,A5,BB,EB,2A,82,90,CD
904 DATA 67,90,ED,5B,82,90,CD,67,90,18,E5
    ,06,04,7E,12,13,12,13,23,10,F8,C9,21
905 DATA 82,90,11,04,00,DD,19,06,08,7E,DD
    ,5E,00,DD,23,DD,56,00,12,23,13,DD,23
906 DATA AF,12,10,EE,C9,C5,2A,82,90,0E,08
    ,E5,06,08,CB,3E,17,23,10,FA,E1,F5,0D
907 DATA 20,F2,0E,08,09,41,F1,2B,77,10,FB
    ,C1,10,E0,C9,00,00,00,00,13,1A,6F,13
908 DATA 1A,67,CD,60,BB,77,C9,00
909 :
910 DATA DD,4E,0A,06,0C,21,94,78,DD,7E,00
    ,77,DD,23,23,10,F7,CD,11,BC,47,3A,94
911 DATA 78,6F,3A,95,78,67,E5,DD,E1,3A,9C
    ,78,5F,3A,9D,78,57,3A,9B,78,92,D8,3A
912 DATA 9A,78,93,D8,3A,98,78,6F,3A,99,78
    ,67,E5,C5,D5,CD,1D,BC,D1,C1,CB,41,28
913 DATA 06,DD,7E,00,77,18,04,7E,DD,77,00
    ,DD,23,E1,2B,00,3A,97,78,BC,20,DF,3A
914 DATA 96,78,BD,20,D9,78,13,FE,00,28,C1
    ,13,13,13,FE,01,28,0A,13,13,13,13,18
915 DATA B4,78,CD,A5,BB,DD,5E,02,DD,56,03
    ,D5,DD,E1,DD,75,00,DD,74,01,C9
```

Basic loader for machine code

```
100 REM Lines 110-300 Demo Routine
105 MODE 1:PRINT "MIX-MODE PROGRAM"
110 PRINT "TYPE 1 FOR CASSETTE CPC464"

120 PRINT "TYPE 2 FOR CPC6128"
150 M$=INKEY$:IF M$="" THEN GOTO 150
160 IF M$="1" THEN ADDRESS=&A3FC
170 IF M$="2" THEN ADDRESS=&9FFC
180 M$="IBM"
190 FOR M=0 TO 2:W=263
200 MODE M:PRINT "MODE ";M
210 FOR SIZE=0 TO 2
220 X=0:Y=W:W=W-32:STYLE=0:GOSUB 260
230 X=0:Y=W:W=W-32:STYLE=1:GOSUB 260:NEX
    T SIZE
240 INPUT "Press <ENTER> to continue";x$
    :NEXT M
250 LOCATE 1,22
256 END
260 IF M=0 AND (SIZE=1 OR SIZE=2) THEN R
    ETURN
270 IF M=1 AND SIZE=2 THEN RETURN
280 PRINT "SIZE=";SIZE;"STYLE=";STYLE:GO
    SUB 300:RETURN
290 :
300 REM The large letters subroutine
310 REM Enter with X,Y,SIZE,STYLE,M$ all
     set.
320 REM The value for Y should be odd.
330 SP=4-SIZE*(SIZE+1):IF SP=-2 THEN SP=
    1
340 FOR N=1 TO LEN(M$):N$=MID$(M$,N,1)
350 IF N$=" " THEN Y=Y-32:GOTO 430
360 FOR T=0 TO 7:P=PEEK(ADDRESS+(ASC(N$)
    -32)*8+T):R=256
370 FOR S=1 TO 8:R=R/2:IF P-R<0 THEN X=X
    +SP:GOTO 410
380 PLOT X,Y,1:IF STYLE=1 THEN PLOT X,Y-
    3,1
390 P=P-R:X=X+SP
400 REM : LOCATE 1,22:INPUT X$
410 NEXT S
420 Y=Y-4:X=X-8*SP:NEXT T
430 Y=Y+32:X=X+8*SP
440 IF X=639 THEN X=0:Y=Y-34
450 NEXT N:RETURN
```

Figure 4



Double-height

A double-height character option is always useful to have: it's the fourth version of COPYCHAR, and only involves three-dozen bytes of extra code. The routines already in use can produce a copy-character (rotated or normal) in UDG 255, and enlarging this character in the vertical axis is simply a matter of spreading the 8-bytes of UDG 255 across the 16-bytes of UDGs 255/254 and then printing UDG 255 on the screen-row beneath UDG 254. A double height character is generated in response to the syntax:

```
CALL &9000,0,COL,ROW
```

The fifth parameter, the 1, tells the machine code to enlarge the character at COL,ROW coordinates by splitting it between the two UDGs. If N is greater than zero, the character will be rotated before it's enlarged. The new character then lies dormant until reprinted by LOCATE X,Y:PRINT CHR$(254):LOCATE X,Y+1:PRINT CHR$(255), or until preserved in two string variables for later use by A$=CHR$(255):B$=CHR$(254). Double-height characters look particularly pleasant in mode 0.

Mixing modes

Having produced a double-height character in any mode, the question which now arises is this: can characters of one particular mode be printed onto a screen of a different mode? The answer is yes, but with some difficulty. One novel way that I've come across is to use interrupts to fool the computer into thinking that the top third of the screen is set to one mode, the middle third to another mode, and the bottom third to yet another mode. This method uses a long machine-code program, running constantly in the background, and the screen is always divided in the system of horizontal zones. Rather more in keeping with our screen-manipulation theme is a Basic program which uses the UDG-matrices to calculate the shape of a character which is then plotted onto the screen. The routine is shown in figure 4. Note the way in which all the standard Amstrad characters are moved out of ROM into RAM (thus creating UDG 32 to UDG 255 inclusive) by the single command SYMBOL AFTER 32. Once in RAM they can be PEEKed and replotted in various sizes anywhere on the screen. It's an interesting program with which to experiment. You can use a machine-code routine at &9134 to find the address of any particular character. In Basic, type

```
A%=0:CALL &9134,@A%,253:PRINT HEX$(A%,4)
```

and the address of the matrix for character 253 will be printed. If you're using SYMBOL AFTER, as you will be in the mix-modes program, remember that it will only work before HIMEM is altered by the MEMORY command. Thus the sequence of events should be:

1. Reset the Amstrad.
2. SYMBOL AFTER 32.
3. Set HIMEM at least as low as &9133.
4. Load &9134-&9147 and use CALL &9134 to find out where UDG 32 is.
5. Load mix-modes program, check that address for UDG 32 is correct.
6. Use the mix-mode program.

Screen saving

Saving and recalling the whole screen was a topic dealt with in Part 2 of this series. Its extravagant use of memory makes it of limited use, but there is no reason why smaller portions of the screen shouldn't be saved, recalled, and moved around. The routine to do this occupies approximately 100 bytes of machine code and, to make it useful, requires from between 1.5k to 5.5k of RAM as screen-storage space. This is considerably better than the 16k normally required to save the entire screen.

The Basic syntax of the screen-save command is:

```
CALL &90C0,D,XR,XL,YT,YB,ADDR
```

ADDR is the memory location reserved for holding the screen-portion. YT and YB are the top and bottom coordinates on the Y axis. XR and XL are the right and left coordinates on the X axis. D is the direction of transfer. Zero to save a screen-portion. Non-zero to load a screen-portion.

Remember that although the process is called screen-saving options of screen copy and screen move are also available. To copy a portion of screen it is only necessary to save it and then recall it to a different location. To move a portion, simply copy it and then, using a Basic window, erase the original. These techniques will be explained in more detail shortly.

The X coordinates used are the normal graphic-screen values from 0 to 639 but the Y values run from 0 to 199 ie: the true vertical resolution of the graphics screen. (The video-controller is responsible for "stretching" the vertical resolution to a perceived 400 units). To keep the machine-code routine short, X and Y are not checked for

Number of saves required:	1	2	3	4
Bytes available for each save:	&1680	&0B40	&0780	&05A0
Mode 2 character-squares per save:	720d	360d	240d	180d
Mode 1 character-squares per save:	360d	180d	120d	90d
Mode 0 character-squares per save:	180d	90d	60d	45d
Beginning of RAM block 1	&78A0	&78A0	&78A0	&78A0
Beginning of RAM block 2	--	&83E0	&8020	&83E0
Beginning of RAM block 3	--	--	&87A0	&7E40
Beginning of RAM block 4	--	--	--	&8980

Table of saving options. The screen-storage area is &1680 bytes.

```
        LIST P
        NOLIST
;SCREEN SAVE/COPY/MOVE

FREERAM EQU &6D00
M5      EQU &6D00
PDMP    EQU M5+2880

PARAM   EQU PDMP+84
M1      EQU PARAM+12
M3      EQU M1+1440
M2      EQU M3+1440
M4      EQU M2+1440

        ORG &90C0

;CALL &90C0,D,XR,XL,YT,YB,ADDR
;             0 screen to RAM
;             1 RAM to screen

SCRMV   LD C,(IX+10)
;create PARAM from params
XCREAT  LD B,12
        LD HL,PARAM
XCL     LD A,(IX+0)
        LD (HL),A
        INC IX
        INC HL
        DJNZ XCL

        CALL &BC11
        LD B,A

;do the move
MV IT   LD A,(PARAM)
        LD L,A
        LD A,(PARAM+1)
        LD H,A
        PUSH HL
        POP IX

        LD A,(PARAM+8)
        LD E,A
        LD A,(PARAM+9)
        LD D,A

;DE LOADED AS XR
;NOW DO "FOR X=XR TO XL STEP 8"
MV1     LD A,(PARAM+7)
        SUB D
        RET C
        LD A,(PARAM+6)
        SUB E
        RET C

        LD A,(PARAM+4)
        LD L,A
        LD A,(PARAM+5)
        LD H,A

;HL LOADED AS YT
;NOW DO "FOR Y=YT TO YB STEP -1"
MV2     PUSH HL

        PUSH BC
        PUSH DE
        CALL &BC1D ;SCR_DOT_POSITION
        POP DE
        POP BC

        BIT 0,C
        JR Z,MV4
        LD A,(IX+0)
        LD (HL),A
        JR MV5
MV4     LD A,(HL)
        LD (IX+0),A

MV5     INC IX

        POP HL
        DEC HL ;ie NEXT Y STEP-1
        NOP
        LD A,(PARAM+3)
        CP H
        JR NZ,MV2
        LD A,(PARAM+2)
        CP L
        JR NZ,MV2

        LD A,B
        INC DE ;ie NEXT X STEP 1,4 OR 8
        CP 0
        JR Z,MV1
        INC DE
        INC DE
        INC DE
        CP 1
        JR Z,MV1
        INC DE
        INC DE
        INC DE
        INC DE
        JR MV1

FINPROG EQU $
;-----------------------------

        END
```

Figure 5: Assembler source code

legality. Furthermore, the surface area of the screen-rectangle delimited by XR, XL, YT, YB is not calculated to ascertain whether it exceeds the amount of memory set aside to receive it. The user must either enter accurate figures to begin with, or else check them in Basic before calling &90C0. In the program presented here, the maximum size of the saved-area has been set to fairly reasonable value, &1680 (5760 bytes), and the user has a number of saving options, which are shown in the table, figure 4.

To use this table first decide what screen mode you wish to work in and how many different saved screen-portions will be needed. If all the saves involve Moves and Copies then the storage RAM won't become blocked because the same RAM can be used over and over again. If, however, the storage of a screen-portion is to be a long-term affair, then the table will establish exactly what you can and can't do. Storing two screen-portions in mode 0 will give a maximum of 90 character-squares per save (arranged in any rectangular shape). If this is insufficient for your needs, you will have to make do with saving just one portion, which gives you a maximum of 180 characters to play with. Alternatively, you may change to a higher-resolution mode. This won't produce more bytes of storage space, but it will allow more character-squares to be saved at one time.

Special effects

Three points are immediately illustrated by the demonstration program. Firstly, the speed of operation of the save/recall cycle is directly proportional to the size of the area being moved. This can be shown simply by adjusting the starting values of XR, XL, YT, and YB on line 110, but the same effect can be put into action by reducing the size of the recall instruction. For example, line 110 can be left alone and line 210 amended so that the XL value reads XL-32. The copied screen-portions are now reduced in size and come onto the screen faster. This brings us to point number two: material not screened is simply left in the RAM storage area. However, XL+32 increases the size of the copy-area and places a certain amount of garbage onto the copy-portion. XR+32 has the same effect as XL–32 and XR–32 has the same effect as XL+32. Point three concerns YT and YB. Changing either YT to YT+1 or YB to YB–1 causes the copied portions of text to slant. The text is readable in modes 2 and 1, but not really so in mode 0. YT–1 or YB+1 causes the slant to go the other way, and a + or – 2 causes a much coarser slant. A pointless exercise on text, but very interesting on graphics and colour displays! As always, make sure that the computed values of XR, XL, YT and YB stay within the legal range, otherwise the machine code program could crash.

The source code for the screen save routine is reproduced in figure 5. It's essentially two nested loops, one for the screen's X axis and one for its Y axis. The direction of transfer is held in the C register and the current screen mode (found by the call to SCR GET MODE) is held in the B register. At the heart of the inner loop is the important call to SCR DOT POSITION, which correctly calculates VDU RAM addresses from the X-Y screen coordinates.

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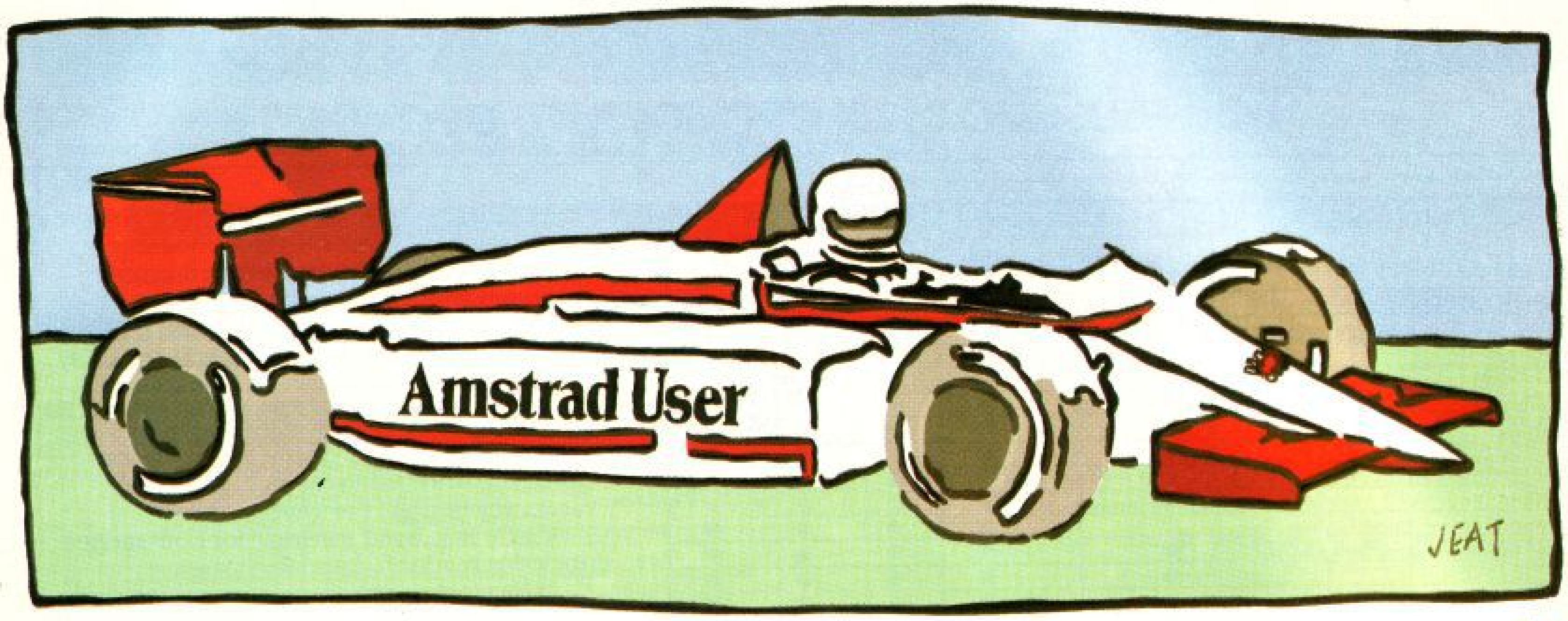
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As you approach a bend you must reduce your speed to something sensible or you score damage points, shown on the damage indicator.

Too much damage is equivalent to colliding with the other cars, resulting in a crash. Completing the circuit entitles you to a bonus and then your rating is displayed on the screen.

Compared to our previous offerings, this is a simple listing to get running. There is only one part to the program and that is entirely Basic. Type it in, save it and run it. Debug it and save it again.

Control is entirely by joystick, left/right go left/right, the central position accelerates, backward decelerates, and forward keeps the speed stable.

```
10 REM ***************************
20 REM *                         *
30 REM *          RACER          *
40 REM * By K. Murfittt for      *
50 REM * Amstrad Computer User   *
60 REM *                         *
70 REM *                         *
80 REM *                         *
90 REM ***************************
100 SYMBOL AFTER 256:MEMORY 39999:POKE 4
    0000,1:POKE 40001,1:POKE 40002,1
110 SYMBOL AFTER 100:GOSUB 3090:ENV 1,7,
    -1,10:ENV 2,7,-1,1:ENV 3,7,-1,50:ENV
     4,3,5,1,50,0,2,15,-1,5:ENV 5,5,-1,2
120 DEFINTa-z:cht$="off":GOSUB 2160:GOTO
     130
130 GOSUB 4690:dis=skill*3:SPEED KEY 12,
    12:SPEED INK 200,200:MODE 0:BORDER 0
    :FOR i=0 TO 11:INK i,0:NEXT:PAPER 0:
    PEN 0:CLS
140 DIM rat$(15):rat$(1)="    KERB CRAWL
    ER":rat$(3)="  PITSTOP PUSHOVER":rat
    $(5)="    MEDIUM MOVER":rat$(7)="
    COOL CORNERER":rat$(9)="    RIGHT RA
    CER":rat$(11)="   TARMAC TEARER":rat
    $(13)="    ROUGH REVVER":rat$(15)="
       BRILL BURNER"
```

```
150 DIM sha(10)
160 rat$(0)=rat$(1):rat$(2)=rat$(1):rat$
    (4)=rat$(3):rat$(6)=rat$(5):rat$(8)=
    rat$(7):rat$(10)=rat$(9):rat$(12)=ra
    t$(11):rat$(14)=rat$(13)
170 ca$=CHR$(182)+CHR$(183):cb$=CHR$(184
    )+CHR$(185)+CHR$(186):cc$=CHR$(187)+
    CHR$(188)+CHR$(189)+CHR$(190):cd$=CH
    R$(191)+CHR$(192)+CHR$(193)+CHR$(194
    )
```

```
180 cdir=0:WINDOW 1,20,1,20:WINDOW#2,9,1
    2,18,19:WINDOW#1,1,20,21,27:PAPER 0:
    CLS:PAPER#1,6:PAPER#2,5:CLS#1:PEN#2,
    7
190 cf$=CHR$(220)+CHR$(221)+CHR$(222)+CH
    R$(223)+CHR$(224)+CHR$(225)+CHR$(226
    )+CHR$(224)
200 cl$=CHR$(154)+CHR$(155)+CHR$(156)+CH
    R$(157)+CHR$(224)+CHR$(225)+CHR$(226
    )+CHR$(158)
210 cr$=CHR$(150)+CHR$(151)+CHR$(152)+CH
    R$(153)+CHR$(158)+CHR$(225)+CHR$(226
    )+CHR$(224):cloud$=CHR$(130)+CHR$(13
    1)+CHR$(132)
```

```
220 pin=0:carpas=0:car=0:dam=0:a=9:b=12:
    so=3000:r1=9:r2=8:r3=7:r4=6
230 start$=CHR$(200)+CHR$(201)+CHR$(202)
    +CHR$(203)+CHR$(204)+CHR$(205)+CHR$(
    206)+CHR$(207)+CHR$(208)+CHR$(209)
240 m1$=CHR$(210)+CHR$(211)+CHR$(216)+CH
    R$(210)+CHR$(211)+CHR$(216)+CHR$(210
    )+CHR$(211)+CHR$(216)+CHR$(210)+CHR$
    (211)+CHR$(216)+CHR$(210)+CHR$(211)+
    CHR$(216)+CHR$(210)+CHR$(211)+CHR$(2
    16)+CHR$(210)+CHR$(211)
250 REM * Set Up Screen *
260 e=PEEK(40000):IF dem$="on"THEN ab$="
    X"ELSE ab$="!"
270 FOR i=1 TO 3:PAPER 6:PRINT"
                  ";:NEXT:PAPER 0:LOCATE 3,
    5:PEN 2:PRINT cloud$:LOCATE 11,8:PRI
    NT cloud$:LOCATE 5,9:PRINT cloud$:LO
    CATE 16,7:PRINT cloud$:PEN 7:PAPER 0
    :LOCATE 1,11:PRINT m1$;
280 FOR i=12 TO 20:PAPER 4:LOCATE 1,i:PR
    INT"                    ";:NEXT
290 PAPER 6:LOCATE 1,2:PEN 1:PRINT" RACE
    R";:PEN 7:PRINT" by K.Murfitt":PAPER
     4:MOVE 0,362:DRAW 639,362,7:DRAW 63
    9,390,7:DRAW 0,390,7:DRAW 0,362,7
```

```
300 IF dem$="on"THEN LOCATE 2,2:PEN 1:PAPER 6:PRINT"PUSH FIRE TO ABORT":PAPER 4
310 qq=32:ww=229:ee=46:rr=235:op=96:FOR i=1 TO 7:MOVE qq,ww:DRAW ee,rr,2:qq=qq+op:ee=ee+op:NEXT:LOCATE#1,1,2:PEN0:PRINT#1,"Score 0      MPH 0":LOCATE#1,1,4:PRINT#1,"Damage";:PEN#1,1
320 ON e GOTO 330,340,350,360
330 LOCATE#1,9,3:PRINT#1,CHR$(160);CHR$(161);CHR$(162):LOCATE#1,9,4:PRINT#1,CHR$(163);CHR$(164);CHR$(165):RESTORE 4520:GOTO 370
340 LOCATE#1,10,3:PRINT#1,CHR$(166):LOCATE#1,9,4:PRINT#1,CHR$(167);CHR$(168);CHR$(169):RESTORE 4540:GOTO 370
350 LOCATE#1,10,3:PRINT#1,CHR$(170);CHR$(171):LOCATE#1,10,4:PRINT#1,CHR$(172);CHR$(173):RESTORE 4560:GOTO 370
360 LOCATE#1,9,3:PRINT#1,CHR$(174);CHR$(175);CHR$(176):LOCATE#1,9,4:PRINT#1,CHR$(177);CHR$(178);CHR$(179):RESTORE 4580
```

```
370 PEN#1,1:MOVE 0,225:DRAW 640,225,7:MOVE 0,0:DRAW 639,0,7:DRAW 639,10,7:DRAW 0,10,7:DRAW 0,0,7:w=8:x=1:y=19:z=16
380 FOR i=20 TO 12 STEP-1:w=w+1:IF w=10 THEN w=8
390 PEN w:LOCATE x,i:PRINT CHR$(214);:PAPER 5:PRINT CHR$(212);:FOR j=1 TO z:PRINT" ";:NEXT:LOCATE y,i:PRINT CHR$(213);:PAPER 4:PRINT CHR$(215);:x=x+1:y=y-1:z=z-2:NEXT
400 IF PEEK(40001)<>3 AND PEEK(40001)<>4 THEN INK 8,6,26:INK 9,26,6 ELSE INK 8,3,13:INK 9,13,3
410 MOVE 200,2:DRAW 200,8,7:MOVE 497,2:DRAW 497,8,7:MOVE 0,81:DRAW 0,351,7:DRAW 639,351,7:DRAW 639,81,7:DRAW 0,81,7:PEN#2,10:PRINT#2,cf$;
420 ON PEEK(40001)GOTO 430,440,450,460
430 bak=12:tex=24:road=13:sky=2:driv=0:drivv=0:cloud=26:grass=18:GOTO 470
440 bak=12:tex=24:road=23:sky=14:driv=0:drivv=0:cloud=26:grass=26:GOTO 470
450 bak=0:tex=24:road=0:sky=0:cloud=0:grass=0:driv=2:drivv=1:GOTO 470
460 bak=0:tex=24:road=0:sky=0:cloud=0:grass=0:driv=2:drivv=1
470 BORDER bak:INK 6,bak:INK 1,tex:INK 0,sky:INK 2,cloud:INK 3,6:INK 4,grass:INK 5,road:INK 7,drivv:INK 10,driv:INK 11,16:INK 12,18:o=0
480 PAPER 0:PEN 7:FOR i=21 TO 11 STEP-1:LOCATE i,6:PRINT MID$(start$,1,o):o=o+1:FOR u=0 TO 99:NEXT:NEXT
490 o$=INKEY$:IF o$=ab$THEN 4670
```

```
500 FOR i=10 TO 1 STEP-1:LOCATE 20,6:PRINT CHR$(181):LOCATE i,6:PRINT start$;" ":FOR u=0 TO 99:NEXT:IF i=9 THEN FOR y=1 TO 3:SOUND 4,400,60,7,1:SOUND 1,400,60,7,1:NEXT:SOUND 4,200,60,7,1:SOUND 1,200,60,7,1
510 NEXT
520 o$=INKEY$:IF o$=ab$THEN 4670
530 FOR i=9 TO 0 STEP-1:LOCATE 20,6:PRINT CHR$(181):LOCATE 1,6:PRINT RIGHT$(start$,i);" ":FOR u=0 TO 99:NEXT:NEXT
540 o$=INKEY$:IF o$=ab$THEN 4670
```

```
550 LOCATE 1,6:PRINT CHR$(180):FOR i=1 TO 700:NEXT
560 EVERY 6,0 GOSUB 610
570 EVERY 30,1 GOSUB 1490
580 EVERY 40,2 GOSUB 1140
590 GOTO 590
600 REM * Move Player *
610 o$=INKEY$:IF o$="!"THEN 4670
620 DI:LOCATE 1,16:PAPER 4:PEN 7:PRINT CHR$(180);"  ";:SOUND 129,so,200,5:SOUND 132,so+20,200,5:EI
630 IF pin>=60 THEN 4730 ELSE IF q=0 THEN 650
640 IF mph>=sp THEN dam=dam+4:GOSUB 1050
650 IF a=9 AND rc>0 AND zz=6 THEN GOSUB 4320
660 IF mph<=50 THEN pin=pin+1
670 IF dem$="on"THEN 5010
680 jy=JOY(0):IF jy=0 THEN GOSUB 780:IF cdir<>0 THEN cdir=0:CLS#2:PRINT#2,cf$;:RETURN
690 IF road=23 AND INT(RND*2)=0 THEN RETURN
700 IF PEEK(40001)=4 AND INT(RND*40)=0 THEN GOSUB 4600
710 IF jy AND 2 THEN GOSUB 920
720 IF jy AND 4 THEN IF a=5 THEN RETURN ELSE a=a-1:b=b-1:cdir=1:GOTO 750
730 IF jy AND 8 THEN IF b=16 THEN RETURN ELSE a=a+1:b=b+1:cdir=2:GOTO 750
740 RETURN
750 DI:CLS#2:WINDOW#2,a,b,18,19:PEN#2,10
760 IF cdir=2 THEN PRINT#2,cr$;:RETURN
770 IF cdir=1 THEN PRINT#2,cl$;:RETURN
780 REM * Faster *
790 IF mph>200 THEN SPEED INK 1,1:GOTO 860
800 IF mph>170 THEN SPEED INK 2,2:GOTO 860
810 IF mph>150 THEN SPEED INK 4,4:GOTO 860
820 IF mph>80 THEN SPEED INK 5,5:GOTO 860
830 IF mph>20 THEN SPEED INK 10,10:GOTO 860
840 IF mph>0 THEN SPEED INK 20,20:GOTO 860
850 IF mph=0 THEN SPEED INK 255,255
860 so=so-30:mph=mph+2:IF mph>226 THEN mph=226
870 IF so<610 THEN so=610
880 IF mph=152 THEN so=so+1000
```

```
890 IF mph=120 THEN EVERY 300,3 GOSUB 4370
900 IF mph=226 THEN sc=sc-1
910 LOCATE#1,12,2:PRINT#1," MPH";mph;:RETURN
920 REM * Slower *
930 IF mph>200 THEN SPEED INK 1,1:GOTO 1000
940 IF mph>170 THEN SPEED INK 2,2:GOTO 1000
950 IF mph>150 THEN SPEED INK 4,4:GOTO 1000
960 IF mph>80 THEN SPEED INK 5,5:GOTO 1000
970 IF mph>20 THEN SPEED INK 10,10:GOTO 1000
980 IF mph>0 THEN SPEED INK 20,20:GOTO 1000
990 IF mph=0 THEN SPEED INK 255,255:GOTO 1000
1000 so=so+30:mph=mph-2:IF mph<0 THEN mph=0
1010 IF so>3000 THEN so=3000
```

```
1020 IF mph=150 THEN so=so-1000
1030 IF mph=120 THEN s=REMAIN(3)
1040 LOCATE#1,12,2:PRINT#1," MPH";mph:RETURN
1050 REM * Check Damage Colours *
1060 IF dem$="on"THEN 1080
1070 IF cht$="on"THEN RETURN
1080 IF dam>=500 THEN pe=3
1090 IF dam<=499 AND dam>=200 THEN pe=1
1100 IF dam<200 THEN pe=12
1110 MOVE 200,2:DRAW 200,8,7:MOVE 497,2:DRAW 497,8,7
1120 MOVE dam,2:DRAW dam,8,pe
1130 IF dam>=632 THEN 1900 ELSE RETURN
1140 REM * Road Movement *
1150 IF q=0 THEN 1190
1160 IF q=1 THEN 1290
1170 IF q=2 THEN 1390
1180 RETURN
1190 IF r1=9 THEN RETURN
1200 IF r1>9 THEN r1=r1-1 ELSE IF r1<9 THEN r1=r1+1
1210 IF r2>8 THEN r2=r2-1 ELSE IF r2<8 THEN r2=r2+1
1220 IF r3>7 THEN r3=r3-1 ELSE IF r3<7 THEN r3=r3+1
1230 IF r4>6 THEN r4=r4-1 ELSE IF r4<6 THEN r4=r4+1
1240 LOCATE r1-1,12:PAPER 4:PEN 9:PRINT" ";CHR$(214);:PAPER 5:PRINT CHR$(212);CHR$(213);:PAPER 4:PRINT CHR$(215);" "
1250 LOCATE r2-1,13:PEN 8:PAPER 4:PRINT" ";CHR$(214);:PAPER 5:PRINT CHR$(212);"  ";CHR$(213);:PAPER 4:PRINT CHR$(215);" "
1260 LOCATE r3-1,14:PEN 9:PAPER 4:PRINT" ";CHR$(214);:PAPER 5:PRINT CHR$(212);"    ";CHR$(213);:PAPER 4:PRINT CHR$(215);" "
1270 LOCATE r4-1,15:PEN 8:PAPER 4:PRINT" ";CHR$(214);:PAPER 5:PRINT CHR$(212);"      ";CHR$(213);:PAPER 4:PRINT CHR$(215);" "
1280 RETURN
1290 IF r1=6 THEN RETURN
```

```
1300 IF r1>6 THEN r1=r1-1
1310 IF r2>6 THEN r2=r2-1
1320 IF r3>6 THEN r3=r3-1
1330 IF r4>6 THEN r4=r4-1
1340 LOCATE r1,12:PEN 9:PAPER 5:PRINT CHR$(143);CHR$(213);:PAPER 4:PRINT CHR$(215);" "
1350 LOCATE r2,13:PEN 8:PAPER 5:PRINT CHR$(143);"  ";CHR$(213);:PAPER 4:PRINT CHR$(215);" "
1360 LOCATE r3,14:PEN 9:PAPER 5:PRINT CHR$(143);"    ";CHR$(213);:PAPER 4:PRINT CHR$(215);" "
1370 LOCATE r4,15:PEN 8:PAPER 5:PRINT CHR$(143);"      ";CHR$(213);:PAPER 4:PRINT CHR$(215);" "
1380 RETURN
1390 IF r1=13 THEN RETURN
1400 IF r1<13 THEN r1=r1+1
1410 IF r2<10 THEN r2=r2+1
1420 IF r3<8 THEN r3=r3+1
1430 IF r4<6 THEN r4=r4+1
1440 LOCATE r1-2,12:PAPER 4:PEN 9:PRINT" ";CHR$(214);:PAPER 5:PRINT CHR$(212);CHR$(143);
1450 LOCATE r2-1,13:PAPER 4:PEN 8:PRINT" ";CHR$(214);:PAPER 5:PRINT CHR$(212);"  ";CHR$(143)
1460 LOCATE r3-1,14:PAPER 4:PEN 9:PRINT"
```

```
   ";CHR$(214);:PAPER 5:PRINT CHR$(2
   12);"    ";CHR$(143);
1470 LOCATE r4-1,15:PAPER 4:PEN 8:PRINT"
   ";CHR$(214);:PAPER 5:PRINT CHR$(2
   12);"       ";CHR$(143)
1480 RETURN
1490 REM * Rival Cars *
1500 IF mph<200 AND rc=0 THEN RETURN
1510 PAPER 5
1520 IF rc=0 THEN 1550
1530 IF rc=1 THEN 1740
1540 IF rc=2 THEN 1820
1550 IF INT(RND*3)<>0 THEN RETURN
1560 IF INT(RND*2)=0 THEN rc=1 ELSE rc=2
1570 GOTO 1490
1580 REM * Cars On The Left Side *
1590 LOCATE r1+1,13:PEN 7:PAPER 5:PRINT
   ca$;:LOCATE r2+1,14:PAPER 5:PRINT"
   ";:RETURN
1600 LOCATE r1+1,13:PRINT"  ";:LOCATE r2
   +1,14:PEN 7:PAPER 5:PRINT ca$;:LOCA
   TE r3+1,15:PAPER 5:PRINT"   ";:RETU
   RN
1610 LOCATE r2+1,14:PRINT"  ";:LOCATE r3
   +1,15:PEN 7:PAPER 5:PRINT cb$;:LOCA
   TE r4+1,16:PAPER 5:PRINT"   ";:RETU
   RN
1620 LOCATE r3+1,15:PRINT"   ";:LOCATE r
   4+1,16:PEN 7:PAPER 5:PRINT cb$;:LOC
   ATE r4,17:PAPER 5:PRINT"    ":LOCAT
   E r4,18:PRINT"    ";:RETURN
1630 LOCATE r4+1,16:PAPER 5:PRINT"   ";:
   LOCATE r4-1,19:PRINT"    ":LOCATE r
   4-1,18:PRINT"    ";:LOCATE r4,17:PE
   N 7:PAPER 5:PRINT cc$;:LOCATE r4,18
   :PAPER 5:PEN 7:PRINT cd$;:RETURN
1640 LOCATE r4,17:PAPER 5:PRINT"    ";:L
   OCATE r4,18:PRINT"    ";:LOCATE r4-
   1,18:PAPER 5:PEN 7:PRINT cc$;:LOCAT
   E r4-1,19:PAPER 5:PEN 7:PRINT cd$;:
   RETURN
1650 carpas=carpas+1:SOUND 130,20,10,7,2
   :sc=sc+mph:LOCATE#1,1,2:PRINT#1,"Sc
   ore";sc;:LOCATE r4-1,18:PAPER 5:PRI
   NT"    ";:LOCATE r4-1,19:PAPER 5:PR
   INT"    ";:zz=0:GOTO 4850
1660 REM * Cars On The Right Side *
1670 LOCATE r1+1,13:PEN 7:PAPER 5:PRINT
   ca$;:LOCATE r2+2,14:PAPER 5:PRINT"
   ";:RETURN
1680 LOCATE r1+1,13:PAPER 5:PRINT"  ";:L
   OCATE r2+2,14:PAPER 5:PEN 7:PRINT c
   a$;:LOCATE r3+3,15:PRINT"   ";:RETU
   RN
1690 LOCATE r2+2,14:PAPER 5:PRINT"  ";:L
   OCATE r3+3,15:PEN 7:PAPER 5:PRINT c
   b$;:LOCATE r4+5,16:PRINT"   ";:RETU
   RN
1700 LOCATE r3+3,15:PAPER 5:PRINT"   ";:
   LOCATE r4+5,16:PEN 7:PAPER 5:PRINT
   cb$;:LOCATE r4+6,17:PRINT"    ";:LO
   CATE r4+6,18:PRINT"    ";:RETURN
1710 LOCATE r4+5,16:PAPER 5:PRINT"   ";:
   LOCATE r4+7,18:PRINT"    ":LOCATE r
   4+7,19:PRINT"    ";:LOCATE r4+6,17:
   PEN 7:PAPER 5:PRINT cc$:LOCATE r4+6
   ,18:PEN 7:PAPER 5:PRINT cd$;:RETURN
1720 LOCATE r4+6,17:PAPER 5:PRINT"    ";
   :LOCATE r4+6,18:PRINT"    ";:LOCAT
   E r4+7,18:PEN 7:PAPER 5:PRINT cc$;:
   LOCATE r4+7,19:PEN 7:PAPER 5:PRINT
   cd$;:RETURN
1730 SOUND 130,20,10,7,2:sc=sc+mph:LOCAT
   E#1,1,2:PRINT#1,"Score";sc;:LOCATE
   r4+7,18:PAPER 5:PRINT"    ";:LOCATE
   r4+7,19:PAPER 5:PRINT"    ";:zz=0:
   carpas=carpas+1:GOTO 4850
1740 REM * Forward/Backward Left Car *
1750 IF mph=200 AND zz=0 THEN zz=1:GOTO
   1810
1760 IF mph<=200 AND zz=1 THEN zz=0:rc=0
   :LOCATE r1+1,13:PRINT"  ";:RETURN
1770 IF zz<0 THEN zz=0
1780 IF mph>200 THEN zz=zz+1 ELSE zz=zz-
   1
1790 IF zz=-1 THEN zz=0:RETURN
1800 SOUND 130,1000,200,zz+1
1810 ON zz GOTO 1590,1600,1610,1620,1630
   ,1640,1650
1820 REM * Forward/Backward Right Car *
1830 IF mph=200 AND zz=0 THEN zz=1:GOTO
   1890
1840 IF mph<=200 AND zz=1 THEN zz=0:rc=0
   :LOCATE r1+1,13:PRINT"  ";:RETURN
1850 IF zz<0 THEN zz=0:rc=0
1860 IF mph>200 THEN zz=zz+1 ELSE zz=zz-
   1
1870 IF zz=-1 THEN zz=0:RETURN
1880 SOUND 130,1000,200,zz+1
1890 ON zz GOTO 1670,1680,1690,1700,1710
   ,1720,1730
1900 REM * Blow Up *
1910 SPEED KEY 10,10
1920 INK 10,0
1930 IF dem$="on"THEN FOR i=0 TO 14:INK
   i,0:NEXT:BORDER 0:MODE 1:RUN 120
1940 FOR i=3 TO 0 STEP-1:x=REMAIN(i):NEX
   T
1950 SPEED INK 255,255
1960 PAPER#2,5:PEN#2,10:PRINT#2,CHR$(228
   )CHR$(229)CHR$(229)CHR$(230)CHR$(23
   1);:PAPER#2,1:PRINT#2,CHR$(228)CHR$
   (230);:PAPER#2,5:PEN#2,10:PRINT#2,C
   HR$(232);
1970 mph=0:LOCATE#1,1,2:PRINT#1,"Score";
   sc:LOCATE#1,13,2:PRINT#1,"MPH 0  ";
1980 SOUND 1,500,500,15,3,0,15:SOUND 2,5
   00,500,15,3,0,15:SOUND 4,500,500,15
   ,3,0,15
1990 WHILE INKEY$<>"":WEND
2000 PRINT CHR$(22)+CHR$(1):PAPER 0:PEN
   7:LOCATE 6,9:PRINT"NO   BONUS"
2010 LOCATE 6,5:PRINT"GAME  OVER"
2020 LOCATE 6,7:PRINT"PRESS FIRE":PRINT
   CHR$(22)+CHR$(0)
2030 ex=0
2040 WHILE INKEY$<>"X":INK 10,INT(RND*27
   ):ex=ex+1:IF ex=600 THEN PAPER#2,5:
   CLS#2
2050 WEND
2060 SPEED INK 10,10
2070 MODE 0:BORDER 0:INK 0,0:INK 1,24:PE
   N 1:PAPER 0:INK 3,18:INK 4,6:INK 5,
   15:INK 6,22:INK 7,26:INK 8,2:INK 9,
   8:INK 10,11:INK 12,16:INK 13,14:INK
   14,6:INK 15,9:CLS
2080 PEN 1:LOCATE 3,2:PRINT"YOUR PLAY RA
   TING IS:"
2090 IF carpas>15 THEN LOCATE 1,8:INK 2,
   26,24:PEN 2:PRINT rat$(15):GOTO 211
   0
2100 LOCATE 1,8:INK 2,26,24:PEN 2:PRINT
   rat$(carpas);
2110 LOCATE 1,13:PEN 5:PRINT"    CARS PA
   SSED:";:PEN 6:PRINT carpas;
2120 LOCATE 1,15:PEN 5:PRINT"    YOU SCOR
   ED:";:PEN 6:PRINT sc;
2130 PEN 3:LOCATE 6,20:PRINT"PRESS FIRE"
2140 WHILE INKEY$<>"X":WEND
2150 RUN 120
2160 REM * Titles *
2170 dem$="off":CALL &BC02
2180 SPEED INK 20,20:SPEED KEY 15,15
2190 WHILE INKEY$<>"":WEND
2200 GOSUB 4690:BORDER 0:MODE 1:INK 0,0:
   INK 1,0:INK 2,0:INK 3,0:PAPER 0:PEN
   1:CLS
2210 MOVE 0,200:DRAW 0,399,6:DRAW 639,39
   9,6:DRAW 639,200,6:DRAW 0,200,6
2220 WINDOW#1,2,8,5,10:WINDOW#2,10,17,5,
   10:WINDOW#3,19,24,5,10:WINDOW#4,26,
   37,5,10:PAPER#1,0:PAPER#2,0:PAPER#3
   ,0:PAPER#4,0
2230 PEN 3:LOCATE 14,2:PRINT"SELECT TRAC
   K:":PEN 1
2240 LOCATE 2,5
2250 PRINT" ";CHR$(250);CHR$(246);CHR$(2
   52);CHR$(252);CHR$(252);CHR$(251);"
   ";CHR$(250);CHR$(251);CHR$(250);
   CHR$(251);"   ";CHR$(250);CHR$(246
   );CHR$(252);CHR$(251);"  ";CHR$(250
   );
2260 FOR i=1 TO 8:PRINT CHR$(252);:NEXT
   i:PRINT CHR$(251);CHR$(250);CHR$(25
   1)
2270 LOCATE 2,6:PRINT" ";CHR$(254);CHR$(
   252);CHR$(252);CHR$(252);CHR$(251);
   CHR$(253);" ";CHR$(250);CHR$(251);C
   HR$(253);CHR$(253);CHR$(253);CHR$(2
   53);CHR$(250);CHR$(251);" ";CHR$(25
   0);CHR$(255);"  ";CHR$(254);CHR$(25
   1);" ";
2280 PRINT CHR$(253);CHR$(250);CHR$(251)
   ;CHR$(250);CHR$(252);CHR$(252);CHR$
   (252);CHR$(252);CHR$(252);CHR$(255)
   ;CHR$(253);CHR$(253)
2290 LOCATE 2,7:PRINT" ";CHR$(250);CHR$(
   252);CHR$(252);CHR$(252);CHR$(255);
   CHR$(253);" ";CHR$(253);CHR$(254);C
   HR$(255);CHR$(254);CHR$(255);CHR$(2
   54);CHR$(255);CHR$(253);" ";CHR$(25
   4);CHR$(251);"  ";CHR$(250);CHR$(25
   5);" ";
2300 PRINT CHR$(253);CHR$(253);CHR$(253)
   ;CHR$(254);CHR$(252);CHR$(252);CHR$
   (252);CHR$(252);CHR$(252);CHR$(252)
   ;CHR$(255);CHR$(253)
2310 LOCATE 3,8:PRINT CHR$(254);CHR$(252
   );CHR$(252);CHR$(251);CHR$(250);CHR
   $(255);" ";CHR$(254);CHR$(252);CHR$
   (246);CHR$(252);CHR$(252);CHR$(252)
   ;CHR$(252);CHR$(255);"  ";CHR$(254)
   ;CHR$(252);CHR$(252);CHR$(255);"  "
   ;
2320 PRINT CHR$(253);CHR$(253);CHR$(254)
   ;CHR$(252);CHR$(252);CHR$(252);CHR$
   (252);CHR$(252);CHR$(252);CHR$(252)
   ;CHR$(252);CHR$(255)
2330 LOCATE 6,9:PRINT CHR$(253);CHR$(253
   ):LOCATE 26,9:PRINT CHR$(253);CHR$(
   254);:FOR i=1 TO 9:PRINT CHR$(252);
   :NEXT i:PRINT CHR$(251)
2340 alo=0
2350 mes$="                          RAC
   ER by K.Murfitt age 14 (c) 1985 ...
   .. Race along the track avoiding ri
   val cars .... Slow down on the corn
   ers or your damage will increase ..
   .. Finish the lap and a bonus will
   be awarded                "
2360 MOVE 0,9:DRAW 639,9,2:DRAW 639,108,
   2:DRAW 0,108,2:DRAW 0,9,2
2370 IF e=0 THEN e=1
2380 LOCATE 6,10:PRINT CHR$(254);CHR$(25
   5):LOCATE 26,10:PRINT CHR$(254);:FO
   R i=1 TO 8:PRINT CHR$(252);:NEXT i:
   PRINT CHR$(247);CHR$(252);CHR$(255)
2390 LOCATE 6,22:PRINT"Press 'D' for a d
   emonstration.":PEN 3:LOCATE 14,24:P
   RINT"Joystick only.":INK 0,0:INK 1,
   24:INK 2,26:INK 3,6
```

```
2400 e=PEEK(40000)
2410 IF e=5 THEN e=1
2420 IF e=0 THEN e=4
2430 ON e GOTO 2440,2450,2460,2470
2440 curs=5:GOTO 2480
2450 curs=13:GOTO 2480
2460 curs=22:GOTO 2480
2470 curs=31
2480 LOCATE 5,12:PRINT"
              "
2490 LOCATE curs,12:PEN 2:PRINT"]"
2500 GOSUB 3040:o$=INKEY$:IF o$=""THEN 2
     500
2510 GOSUB 3070
2520 IF o$=CHR$(8)THEN e=e-1:GOTO 2410
2530 IF o$=CHR$(9)THEN e=e+1:GOTO 2410
2540 IF o$="m"THEN 4610
2560 IF o$="X"THEN 2590
2570 IF o$="d"THEN 4980
2580 GOTO 2500
2590 LOCATE curs,12:PRINT" ":LOCATE 14,2
     :PRINT"                 ":WINDOW#5,1,40
     ,19,25:PAPER#5,0:PEN#5,0:CLS#5
2600 IF e=1 THEN RESTORE 4520:GOSUB 3000
2610 IF e=2 THEN RESTORE 4540:GOSUB 3010
2620 IF e=3 THEN RESTORE 4560:GOSUB 3020
2630 IF e=4 THEN RESTORE 4580:GOSUB 3030
2640 MOVE 0,172:DRAW 639,172,2:DRAW 639,
     69,2:DRAW 0,69,2:DRAW 0,172,2
2650 POKE 40000,e
2660 PEN 3:LOCATE 8,16:PRINT"SELECT COND
     ITIONS: ";
2670 con=PEEK(40001)
2680 PEN 1
2690 ON con GOTO 2700,2710,2720,2730
2700 LOCATE 27,16:PRINT"NORMAL        ";:
     GOTO 2740
2710 LOCATE 27,16:PRINT"ICY           ";:
     GOTO 2740
2720 LOCATE 27,16:PRINT"NIGHT         ";:
     GOTO 2740
2730 LOCATE 27,16:PRINT"THUNDER STORM";
2740 o$=INKEY$:IF o$=""THEN 2740
2750 IF o$=CHR$(9)THEN con=con+1:IF con=
     5 THEN con=1
2760 IF o$=CHR$(8)THEN con=con-1:IF con=
     0 THEN con=4
2770 IF o$="X"THEN GOSUB 3070:GOTO 2790
2780 GOTO 2690
2790 PEN 3
2800 POKE 40001,con
2810 LOCATE 8,18:PRINT"SELECT PLAY LEVEL
     : ";:PEN 1:PRINT"1"
2820 skill=1
2830 o$=INKEY$:IF o$=""THEN 2830
2840 IF o$=CHR$(8)THEN skill=skill-1:IF
     skill=0 THEN skill=5
2850 IF o$=CHR$(9)THEN skill=skill+1:IF
     skill=6 THEN skill=1
     ES      ";
2860 LOCATE 26,18:PRINT skill;
2870 IF o$="X"THEN GOSUB 3070:GOTO 2880
     ELSE 2830
2880 PEN 3:LOCATE 6,20:PRINT"CHANGE YOUR
     CHOICES: ";:PEN 1:PRINT"NO ";
2890 chan=1
2900 o$=INKEY$:IF o$=""THEN 2900
2910 IF o$=CHR$(9)THEN chan=chan+1:IF ch
     an=4 THEN chan=1
2920 IF o$=CHR$(8)THEN chan=chan-1:IF ch
     an=0 THEN chan=3
2930 IF chan=1 THEN LOCATE 27,20:PRINT"N
     O      ";
2940 IF chan=3 THEN LOCATE 27,20:PRINT"E
     XIT GAME";
2950 IF chan=2 THEN LOCATE 27,20:PRINT"Y
2960 IF o$="X"AND chan=1 THEN GOSUB 3070
     :dem$="off":GOTO 130
2970 IF o$="X"AND chan=2 THEN GOSUB 3070
     :GOTO 2160
2980 IF o$="X"AND chan=3 THEN GOSUB 3070
     :GOTO 4680
2990 GOTO 2900
3000 CLS#2:CLS#3:CLS#4:RETURN
3010 CLS#1:CLS#3:CLS#4:RETURN
3020 CLS#1:CLS#2:CLS#4:RETURN
3030 CLS#1:CLS#2:CLS#3:RETURN
3040 REM * Scroll Title Message *
3050 IF alo=227 THEN alo=0
3060 PEN 3:alo=alo+1:LOCATE 8,20:PRINT M
     ID$(mes$,alo,26);:PEN 2:RETURN
3070 REM * Plink! *
3080 SOUND 1,50,10,7,2:SOUND 4,80,10,7,2
     :RETURN
3090 REM * Symbols *
3100 SYMBOL 220,0,0,0,0,15,27,23
3110 SYMBOL 221,0,0,0,7,159,252,247,192
3120 SYMBOL 222,0,0,0,224,249,31,247,3
3130 SYMBOL 223,0,0,0,0,240,248,248
3140 SYMBOL 224,126,207,191,255,255,255,
     255,126
3150 SYMBOL 225,63,39,109,239,255,72,56
3160 SYMBOL 226,252,228,246,183,255,18,2
     8
3170 SYMBOL 227,126,255,255,255,255,255,
     255,126
3180 SYMBOL 200,60,78,191,255,255,126,36
     ,60
3190 SYMBOL 201,7,25,97,129,129,97,25,7
3200 SYMBOL 202,255,0,119,85,118,69,0,25
     5
3210 SYMBOL 203,255,0,119,101,71,116,0,2
     55
3220 SYMBOL 187,0,0,0,0,0,30,55,1
3230 SYMBOL 188,0,0,0,0,0,63,104,207
3240 SYMBOL 189,0,0,0,0,0,252,22,243
3250 SYMBOL 190,0,0,0,0,0,120,220,128
3260 SYMBOL 191,124,206,190,255,255,254,
     254,124
3270 SYMBOL 192,255,207,219,223,255,239,
     48
3280 SYMBOL 193,255,243,219,251,255,247,
     12
3290 SYMBOL 194,62,103,95,255,255,127,12
     7,62
3300 SYMBOL 216,0,0,2,67,229,165,123,255
3310 SYMBOL 250,0,0,0,15,31,28,24,24
3320 SYMBOL 251,0,0,0,240,248,56,24,24
3330 SYMBOL 252,0,0,0,255,255,0,0,0
3340 SYMBOL 253,24,24,24,24,24,24,24,24
3350 SYMBOL 254,24,24,28,31,15
3360 SYMBOL 255,24,24,56,248,240
3370 SYMBOL 150,0,0,0,0,3,6,5,126
3380 SYMBOL 151,0,0,0,1,231,255,253,112
3390 SYMBOL 152,0,0,0,248,254,7,253,0
3400 SYMBOL 153,0,0,0,0,124,254,254,192
3410 SYMBOL 154,0,0,0,0,62,111,95,3
3420 SYMBOL 155,0,0,0,31,127,240,223,0
3430 SYMBOL 156,0,0,0,128,231,127,223,14
3440 SYMBOL 157,0,0,0,0,192,224,224,126
3450 SYMBOL 158,207,191,255,255,255,255,
     126
3460 SYMBOL 160,8,101,136,128,127,0,0,12
     7
3470 SYMBOL 161,0,255,0,0,254,1,1,254
3480 SYMBOL 162,0,252,2,2,2,2,2,2
3490 SYMBOL 163,128,128,127
3500 SYMBOL 164,0,0,254,1,1,1,1
3510 SYMBOL 165,2,2,28,32,32,32,32,192
3520 SYMBOL 166,0,0,0,0,0,34,85,85
3530 SYMBOL 167,62,65,65,64,64,64,63
3540 SYMBOL 168,85,85,85,136,0,32,151,32
3550 SYMBOL 169,60,66,66,130,2,2,252
3560 SYMBOL 170,2,9,18,16,16,96,128,128
3570 SYMBOL 171,0,96,16,16,16,14,1,1
3580 SYMBOL 172,112,8,8,8,7
3590 SYMBOL 173,14,16,16,16,224
3600 SYMBOL 174,0,0,0,0,0,3,4,4
3610 SYMBOL 175,0,0,0,0,0,255,0,15
3620 SYMBOL 176,0,0,0,0,0,226,21,229
3630 SYMBOL 177,4,4,4,4,4,4,4,3
3640 SYMBOL 178,16,79,160,191,128,127,0,
     255
3650 SYMBOL 179,5,253,1,254,0,254,1,230
3660 SYMBOL 180,128,128,128,128,128,128,
     128,128
3670 SYMBOL 181,1,1,1,1,1,1,1,1
3680 SYMBOL 182,0,27,63,111,181,253,247,
     96
3690 SYMBOL 183,0,216,252,246,173,191,23
     9,6
3700 SYMBOL 184,29,39,121,205,191,255,25
     2,120
3710 SYMBOL 185,60,195,126,126,126,219,1
     02
3720 SYMBOL 186,152,164,222,179,239,255,
     63,30
3730 SYMBOL 204,255,0,39,85,118,85,0,255
3740 SYMBOL 205,255,0,112,96,64,112,0,25
     5
3750 SYMBOL 206,255,0,114,37,37,34,0,255
3760 SYMBOL 207,255,0,14,12,2,14,0,255
3770 SYMBOL 208,255,0,228,74,78,74,0,255
3780 SYMBOL 209,255,1,239,165,197,165,1,
     255
3790 SYMBOL 210,0,0,24,44,110,95,159,255
3800 SYMBOL 211,0,24,36,66,213,183,251,2
     55
3810 SYMBOL 130,0,0,0,0,5,111,255,51
3820 SYMBOL 131,0,24,124,188,222,251,255
     ,231
3830 SYMBOL 228,2,194,250,127,31,239,255
     ,127
3840 SYMBOL 229,34,99,231,247,247,255,25
     5,255
3850 SYMBOL 230,64,67,95,254,248,247,255
     ,254
3860 SYMBOL 231,63,127,255,63,31,63,127,
     199
3870 SYMBOL 232,252,254,255,252,254,227,
     198,194
3880 SYMBOL 132,0,0,0,0,128,144,252,104
3890 SYMBOL 133,0,12,18,46,55,51,51,49
3900 SYMBOL 134,7,24,39,95,95,95,103,120
3910 SYMBOL 135,224,24,228,250,250,250,2
     30,30
3920 SYMBOL 136,0,48,104,92,236,204,204,
     140
3930 SYMBOL 137,48,24,28,15,7
3940 SYMBOL 138,111,103,103,115,179,57,2
     9,13
3950 SYMBOL 139,254,254,254,254,253,252,
     248,240
3960 SYMBOL 140,12,24,56,240,224
3970 SYMBOL 141,2,2,2,2,26,58,122,125
3980 SYMBOL 142,192,192,192,192,216,220,
     222,190
3990 SYMBOL 145,124,121,55,15,1
4000 SYMBOL 144,62,254,252,240,128
4010 RETURN
4020 REM * Completed Track *
4030 SPEED INK 255,255:GOSUB 4890
4040 IF dem$="on"THEN FOR i=0 TO 3:x=REM
     AIN(i):NEXT:FOR i=0 TO 15:INK i,0:N
     EXT:BORDER 0:MODE 1:RUN 120
4050 FOR i=2000 TO 10 STEP-20:SOUND 1,i,
     1,5:SOUND 4,i+30,1,5:NEXT i
4060 FOR i=0 TO 3:x=REMAIN(i):NEXT i
4070 WHILE INKEY$<>"":WEND
4080 mph=0:LOCATE#1,1,2:PRINT#1,"Score";
     sc:LOCATE#1,13,2:PRINT#1,"        ";
```

```
4090 FOR i=1 TO 500:NEXT i
4100 PEN 7:PAPER 0:PRINT CHR$(22)+CHR$(1
     ):LOCATE 8,5:PRINT"BONUS":PRINT CHR
     $(22)+CHR$(0)
4110 MOVE dam-4,2:DRAW dam-4,8,7
4120 FOR i=dam TO 632 STEP 4
4130 MOVE i,2:DRAW i,8,2
4140 SOUND 1,500,1,5:SOUND 4,500,1,5
4150 MOVE 200,2:DRAW 200,8,7:MOVE 497,2:
     DRAW 497,8,7
4160 sc=sc+(skill*2)+22
4170 LOCATE#1,1,2:PRINT#1,"Score";sc
4180 NEXT i
4190 LOCATE 6,5:PRINT"GAME  OVER"
4200 LOCATE 6,7:PRINT"PRESS FIRE":PRINT
     CHR$(22)+CHR$(0)
4210 WHILE INKEY$<>"X":WEND
```




```
4220 MODE 0:BORDER 0:INK 0,0:INK 1,24:PE
     N 1:PAPER 0:INK 3,18:INK 4,6:INK 5,
     15:INK 6,22:INK 7,26:INK 8,2:INK 9,
     8:INK 10,11:INK 12,16:INK 13,14:INK
      14,6:INK 15,9:CLS
4230 IF cht$="on"THEN LOCATE 6,7:PEN 2:I
     NK 2,15:PRINT"  CHEAT!":LOCATE 6,21
     :PRINT"PRESS FIRE":GOTO 4310
4240 FOR i=1 TO 100:MOVE 325,200:DRAW IN
     T(RND*650),INT(RND*400),INT(RND*14)
     +1:NEXT i
4250 LOCATE 9,11:PRINT CHR$(133);CHR$(13
     4);CHR$(135);CHR$(136)
4260 LOCATE 9,12:PRINT CHR$(137);CHR$(13
     8);CHR$(139);CHR$(140)
4270 LOCATE 10,13:PRINT CHR$(141);CHR$(1
     42);:LOCATE 10,14:PRINT CHR$(145);C
     HR$(144);
4280 PRINT CHR$(22)+CHR$(1):INK 2,15:PEN
      2:LOCATE 6,7:PRINT"WELL DONE!":LOC
     ATE 6,21:PRINT"PRESS FIRE":PRINT CH
     R$(22)+CHR$(0)
4290 l=1:s=15
4300 FOR i=1000 TO 50 STEP-s:SOUND 1,i,l
     ,7:NEXT i:FOR i=1000 TO 50 STEP-s:S
     OUND 4,i,l,5:NEXT i:FOR i=1000 TO 5
     0 STEP-s:SOUND 1,i,l,3:NEXT i:FOR i
     =1000 TO 50 STEP-s:SOUND 4,i,l,2:NE
     XT i:FOR i=1000 TO 50 STEP-s:SOUND
     1,i,l,1:NEXT i
4310 o$=INKEY$:IF o$="X"THEN RUN 120 ELS
     E INK INT(RND*14)+1,INT(RND*25)+1:G
     OTO 4310
4320 REM * Scrape Rival Car *
4330 SOUND 129,so,35,5:SOUND 132,so+20,3
     5,5:SOUND 130,3,50,7,0,0,7
4340 FOR i=1 TO 20:dam=dam+4:GOSUB 1050:
     NEXT i
4350 CLS#2:PRINT#2,cf$;
```

```
4360 RETURN
4370 REM * Read Track *
4380 sc=sc+mph:LOCATE#1,1,2:PRINT#1,"Sco
     re";sc;:LOCATE#1,12,2
4390 READ q,w
4400 IF q=3 AND w=3 THEN FOR i=1000 TO 1
     00 STEP-20:SOUND 1,i,1,5:SOUND 4,i,
     1,5:NEXT i:GOTO 4020
4410 ON w GOTO 4420,4430,4440,4450,4460,
     4470,4480,4490,4500
4420 sp=220:sp=sp-dis:RETURN
4430 sp=214:sp=sp-dis:RETURN
4440 sp=210:sp=sp-dis:RETURN
4450 sp=204:sp=sp-dis:RETURN
4460 sp=200:sp=sp-dis:RETURN
4470 sp=190:sp=sp-dis:RETURN
4480 sp=184:sp=sp-dis:RETURN
4490 sp=176:sp=sp-dis:RETURN
4500 sp=160:sp=sp-dis:RETURN
4510 REM * Track ONE *
4520 DATA0,0,0,0,2,6,0,0,2,4,0,0,1,7,0,0
     ,2,5,0,0,2,6,0,0,1,2,0,0,0,0,2,5,0,
     0,0,0,1,9,0,0,0,0,2,9,0,0,3,3
```

```
4530 REM * Track TWO *
4540 DATA0,0,0,0,1,5,0,0,0,0,1,5,0,0,1,5
     ,0,0,2,8,0,0,1,6,0,0,2,1,0,0,1,9,0,
     0,2,8,0,0,1,6,0,0,1,4,0,0,0,0,1,5,0
     ,0,3,3
4550 REM * Track THREE *
4560 DATA0,0,2,3,0,0,1,5,0,0,2,2,0,0,2,7
     ,0,0,1,1,0,0,2,4,0,0,1,5,0,0,2,4,0,
     0,2,3,0,0,1,5,0,0,2,7,0,0,3,3
4570 REM * Track FOUR *
4580 DATA0,0,0,0,0,0,2,2,0,0,0,0,2,6,0,0
     ,0,0,2,9,0,0,0,0,1,9,0,0,0,0,1,4,0,
     0,2,7,0,0,2,5,0,0,0,0,2,4,0,0,1,7,0
     ,0,1,5,0,0,0,0,0,0,2,8,0,0,3,3
4590 REM * Lightning *
4600 FOR i=0 TO 15:INK i,26:NEXT i:INK 8
     ,3,13:INK 9,13,3:SOUND 130,2000,150
     ,15,4,0,15:INK 0,sky:INK 1,tex:INK
     2,cloud:INK 3,6:INK 4,grass:INK 5,r
     oad:INK 6,bak:INK 7,drivv:INK 10,dr
     iv:INK 11,16:RETURN
4610 GOSUB 3040
4620 o$=INKEY$:IF o$="s"THEN GOSUB 3070:
     GOTO 4630 ELSE IF o$=""THEN GOSUB 3
     040:GOTO 4620 ELSE 2500
4630 o$=INKEY$:IF o$="o"THEN GOSUB 3070:
     GOTO 4640 ELSE IF o$=""THEN GOSUB 3
     040:GOTO 4630 ELSE 2500
4640 o$=INKEY$:IF o$="f"THEN GOSUB 3070:
     GOTO 4650 ELSE IF o$=""THEN GOSUB 3
     040:GOTO 4640 ELSE 2500
```

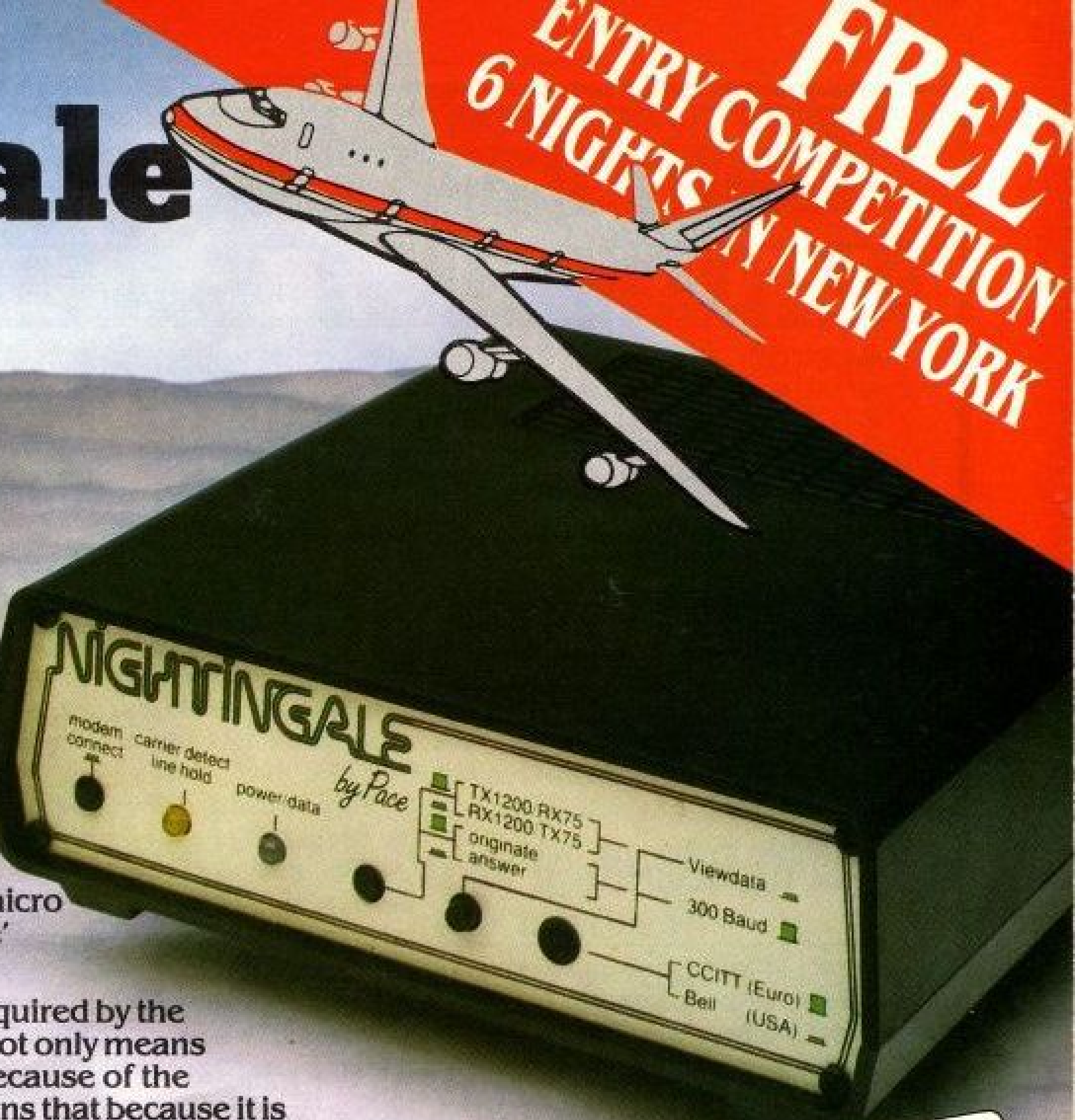
```
4650 o$=INKEY$:IF o$="t"THEN GOSUB 3070:
     GOTO 4660 ELSE IF o$=""THEN GOSUB 3
     040:GOTO 4650 ELSE 2500
4660 cht$="on":GOTO 2500
4670 MODE 0:INK 0,0:BORDER 0:INK 1,24:PE
     N 1:PAPER 0:CLS:SPEED INK 255,255:L
     OCATE 1,8:PEN 1:PRINT"    GAME ABOR
     TED":RUN 120
4680 FOR i=26 TO 0 STEP-1:INK 1,i:INK 2,
     i:INK 3,i:FOR j=1 TO 5:NEXT j:NEXT
     i:MODE 1:CALL &BC02:CALL &BB00:CLS:
     END
4690 REM * Fancy Cls *
4700 IF INT(RND*2)=0 THEN 4720
4710 FOR i=1 TO 25:LOCATE 1,1:PRINT"":N
     EXT i:RETURN
4720 FOR i=1 TO 25:LOCATE 1,25:PRINT"
     :NEXT i:RETURN
4730 REM * Disqualified *
4740 FOR i=0 TO 3:x=REMAIN(i):NEXT i
```

```
4750 SPEED INK 255,255:FOR i=10 TO 1000
     STEP 15:SOUND 1,i,1,5:SOUND 4,i+20,
     1,5:NEXT i
4760 PRINT CHR$(22)+CHR$(1):PAPER 0:PEN
     7:LOCATE 6,9:PRINT"NO   BONUS":LOCA
     TE 6,5:PRINT"GAME  OVER":LOCATE 6,7
     :PRINT"PRESS FIRE":PRINT CHR$(22)+C
     HR$(0)
4770 SPEED KEY 10,10
4780 o$=INKEY$:IF o$="X"THEN 4790 ELSE 4
     780
4790 CLS:MODE 0:BORDER 0:INK 0,0:INK 1,2
     4:INK 2,6:INK 3,15,24:PAPER 0:PEN 3
     :CLS
4800 SPEED INK 10,10
4810 LOCATE 1,2:PRINT"   YOU HAVE BEEN":
     LOCATE 1,4:PRINT"  DISQUALIFIED FOR
     ":LOCATE 1,6:PRINT" DRIVING TOO SLO
     WLY."
4820 PEN 2:LOCATE 6,20:PRINT"PRESS FIRE"
4830 o$=INKEY$:IF o$="X"THEN 4840 ELSE 4
     830
4840 GOSUB 4690:RUN 120
4850 REM * Check For Collision *
4860 IF a<9 AND rc=1 THEN carpas=carpas-
     1:GOTO 1900
4870 IF a>9 AND rc=2 THEN carpas=carpas-
     1:GOTO 1900
4880 rc=0:cp%=0:RETURN
4890 REM * Player Car Ride Off Into Dist
     ance *
4900 LOCATE 4,19:PAPER 5:PRINT"
        ":LOCATE 5,18:PRINT"
      ":LOCATE 7,17:PRINT"        "
4910 LOCATE 10,16:PEN 10:PRINT cb$
4920 FOR i=1 TO 200:NEXT i
4930 LOCATE 10,16:PRINT"   "
4940 LOCATE 10,15:PRINT cb$
4950 FOR i=1 TO 200:NEXT i
4960 LOCATE 10,15:PRINT"   "
4970 LOCATE 9,14:PRINT cb$:FOR i=1 TO 20
     0:NEXT i:LOCATE 9,14:PRINT"   ":LOC
     ATE 10,13:PRINT ca$:FOR i=1 TO 200:
     NEXT i:LOCATE 10,13:PRINT"  ":RETUR
     N
4980 REM * Demonstration Mode *
4990 dem$="on":RETURN
5000 REM * Control Demonstration *
5010 o$=INKEY$:IF o$="X"THEN MODE 1:FOR
     i=0 TO 14:INK i,0:NEXT:BORDER 0:POK
     E 40000,1:POKE 40001,1:POKE 40002,1
     :RUN 120
5020 IF q=0 THEN GOSUB 780
5030 IF q=0 THEN sp=230
5040 IF PEEK(40001)=4 AND INT(RND*40)=0
     THEN GOSUB 4600
5050 IF rc=1 AND a<11 THEN a=a+1:b=b+1:c
     dir=2:IF a=5 THEN 5070 ELSE GOSUB 7
     50
5060 IF rc=2 AND a>7 THEN a=a-1:b=b-1:cd
     ir=1:IF b=16 THEN 5070 ELSE GOSUB 7
     50
```

```
5070 IF mph>=sp THEN GOSUB 920
5080 IF mph>sp THEN dam=dam+4:GOSUB 1050
5090 IF cdir<>0 AND rc=1 AND a=11 THEN C
     LS#2:PRINT#2,cf$;:cdir=0
5100 IF rc=2 AND cdir<>0 AND a=7 THEN CL
     S#2:PRINT#2,cf$;:cdir=0
5110 RETURN
5120 REM ******************
5130 REM *                *
5140 REM * End Of Program *
5150 REM *                *
5160 REM ******************
```

ACU

Nightingale
The Modem



The facts speak for themselves, **Nightingale** is without equal in its field. It is undoubtedly the most popular multi baud rate modem available today. Whatever your communication requirements, the simplicity of use and the versatility of **Nightingale** will enable you to provide a solution whether the need is to extract information from Prestel, send telex's via Telecom Gold, download telesoftware or exchange files, **Nightingale** will do the job and a whole lot more besides.

Nightingale operates at the two most popular baud rates 1200/75 as used by both private and public viewdata systems and 300/300 baud for communication with remote mainframe, mini or micro systems. Also available in 'reverse viewdata mode' 75/1200.

Nightingale has passed the very rigorous tests required by the BABT and is fully approved for use in the UK. This not only means that you can rely upon the safety of the product because of the stringent manufacturing constraints, but also means that because it is a BABT approved product, you can be assured that your application to Telecom Gold, Prestel etc., will not be refused.

The Software – *COMMSTAR*

A fitting partner for the Nightingale modem, this software has been developed to meet the demands of the discerning Amstrad User. With its powerful combination of Viewdata and ASCII terminal capabilities contained on Eprom. It will allow you to use to the full, the versatility of the Nightingale modem in accessing information from Prestel, sending or receiving files, or sending telex messages etc. It fully supports Dynamic Screens and also Telesoftware downloading from the Amstrad Database from Viewfax. Mode 0 is used to allow all eight colours to be used including flashing and double height characters to be displayed. 12 User function keys are used and Passwords and identity codes etc., may be programmed in using these. It comes complete with Dual channel RS232 Interface which can also be used for serial printers, plotters etc.

The Competition



Pace have linked with the premier computer information provider on Prestel, MICRONET and Virgin Atlantic Airlines, all pioneers in their own fields, to offer you a challenge. A chance to try out your skills using your modem and play the 'Pace round Britain Quiz' on Micronet, and in so doing, an opportunity to win a fabulous holiday for two in New York.

This competition will be open to you between November 1st and February 1st if you buy one of our modems before the end of January. In addition, you will be given, free of charge, a full quarters subscription to MICRONET worth £10, and free registration to Microlink on Telecom Gold.

The prize includes a return flight to New York, 6 nights accommodation in a high quality New York Hotel, and spending money to the total value of £400.

Full details are contained with each modem.

micronet 800

Virgin atlantic

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Hang it on the telephone

Modem users are a funny crowd. They talk about stop bits and baud rates, parity and protocol. Simon Rockman looks at what you need to do to join them and why.

If you are a real computer buff you will already have a disc drive or two, and a printer for your 'Straddy, but to fill your Saturday mornings in the local computer shop – and to give yourself something to talk about down at the local computer club – you should consider a modem.

A good system just plugs together and off you go. A modem is an excellent tool in crushing the sceptical question from visitors, the one every computer owner dreads . . . "Yes but what can it do?".

With a modem you log into Prestel, order a couple of cases of wine, download a free program, check the depth of the snow in St Moritz and the time of the train your visitor has to catch home – and they should be convinced.

Log into Telecom Gold and send a telex to someone on the other side of the planet and they will be reaching for their chequebook.

A modem opens up a whole new facet to home computing. It makes you understand why radio hams spend half their lives in the cupboard under the stairs. Once you can link your computer to other computers there is a whole community to talk to.

There are thousands of other computer owners out there just waiting to chat. There is nothing they would rather do than send a message from their Spectrum, Beeb, Commodore, Apple, Amstrad or Atari to your 'Straddy. It is up to you to reply.

Get the message across

It is one thing to link two computers together when they are both in the same room, it is quite another to send a message from one computer to another when you have to use the public telephone lines. The simplest method of communication is user to user.

To send a file from one computer to another you ring the person you want to write to, get them to plug their modem in and with suitable jiggery pokery you should be able to send them your chemistry homework, your favourite recipe for lemon ice cream or a copy of the program you have just typed in from *Amstrad User*.

This is fine if you only want to send the occasional file to one person but what if you want to send a lot of files to a lot of different people? They will not always be in at the right time and it would be very time consuming to call 50 friends.

A common way around this is to use a central computer. You upload (send) your file to a central computer and then everyone else can download (receive) the file when they log into the computer at a later date.

On a small scale you can use a bulletin board. This is usually a micro attached to the 'phone by a private individual for the fun of running the service. These system operators (sysops) offer the use of their computers and telephone lines out of the goodness of their hearts. To run a Bulletin Board System (BBS) takes a lot of work – and a fair bit of time – so most users respect this and don't fill the systems with loads of junk or send rude messages.

There are loads of bulletin boards around the country – if you are well known on one you are likely to be known throughout the country.

Micro bulletin boards are slow and limited in disc space but the greatest limitation is that most only allow one caller at a time. Getting through to a popular BBS at cheap rate can take a very long time. A better approach is to use one of the mainframe electronic mail (E-mail) systems.

Mainframe computers are horrendously expensive and it would be a very wealthy sysop who went around offering free useage of a DEC 10. In practice E-mail systems are run to make money. In the UK there are two main systems – Prestel and Telecom Gold. Both are owned by British Telecom, both offer some similar facilities but they are pitched at very different markets.

All that glisters . . .

Telecom Gold is primarily a messaging service. You can write and edit documents using Gold and then send them to as many different people as you like with little extra cost. You can get a message from one user and forward it to another. It is simple to reply to a message and easy to look after your account.

In many ways Gold is a grown-up BBS. There are special interest groups (SIGs) and a variety of games. You can send and receive international telexes, link into the radiopaging system or chat to other users.

There are some news services but on the whole Gold is used for person to person comms, particularly in cases where the standard postal system (Snail Mail) is too slow. If there is a major snag in using Gold it is the price. Even with the cheap MicroLink scheme you need to time your calls carefully and avoid peak rates to keep the bill down. You can contact *Amstrad User* by using Gold on 72:MAG012.

The power behind the button

Most home modem users will want to use Prestel. This was a system designed to allow anyone with a television and a telephone to log into a computer.

It was initially envisaged that users would only have a numeric keypad to select the page they wanted to read. This meant that the system was divided into two groups, users and information providers (IPs). Users would only want to read the data – IPs would want to display it.

As a result most people access Prestel at 1200/75 baud – that is, information is received at 1200 characters per second (cps) but is sent at an incredibly slow 75 cps. This makes Prestel very difficult to use for electronic mail (unless you only want to send short messages), but ideal for getting the latest news and sport details.

With the boom in microcomputing Prestel has really taken off. Computer owners can send short E-mail messages and even download programs. It is still an IP/user based system but there is plenty of micro-news. The most successful area of Prestel is Micronet 800, aimed at micro users. A rival IP, Viewfax, runs an Amstrad-specific database known as Amsnet. This should improve and grow as the number of Amstrad users mushrooms, but at the moment it seems to lack direction.

Because of its heritage Prestel uses a character set like no other. For a start it is a colour system with eight colours on a 1k page. This means that there is a whole set of characters which mean "change current printing colour to . . .", a funny selection of graphic squares and a host of control codes.

The system ends up looking like teletext but with a few changes. Dedicated Prestel terminals have special chips to cope with all this and Mode 7 on the BBC Micro emulates Prestel. Anyone who has to write terminal software for a computer without these custom chips faces a daunting task.



Pace Nightingale/Commstar

Pace has been very successful in selling its modems to BBC Micro owners. Part of this success has been due to the Commstar ROM for the Beeb. When they wanted to sell their modems to the Amstrad computer users they looked around for suitable software and settled on HoneyComm. They renamed the software as Amstrad Commstar but did not make any other changes and the result is that Pace Commstar is just as great as HoneyComm but comes with its own serial interface, all in one box, on the end of a short ribbon cable, a lead to the modem and a pretty good little manual. Included in the package is a free subscription to Micronet and Prestel and free membership to Telecom Gold's MicroLink.

The Pace/Commstar set-up cures all the problems of building a system around the excellent Honeysoft software. The modem has a good reputation, working well and reliably. When the loan agreement with the magazine expires we will have to raid the swear box and buy it.

Summary

For – Features, quality ease of use. **Against** – Top end price. **Conclusion** – The best of the bunch.

Cirkit

The cheapest set-up is the acoustic coupler from Cirkit. The modem needs a standard telephone and works by attaching a microphone to the earpiece and a speaker to the mouthpiece to send the data down the telephone lines.

This is not the most reliable method being prone to stray noise. The software has been written specially by Honeysoft (more about them later) but lacks some of the more advanced bells and whistles.

The main selling point of the Cirkit set-up is the price – you get a modem, a serial interface and software for £30. This is cheap enough for most people to buy just to see if they like the idea of using a modem without risking a lot of cash. The main limitation is the lack of a telesoftware downloader for Prestel and a simple terminal for Gold.

The serial interface is dedicated to the modem – it cannot be used from CP/M and will not work with other modems or serial printers. Being battery powered you can use the Cirkit set-up without having too many trailing wires but it is expensive to run. The software is supplied on tape unprotected so that it can be copied to disc.

Summary

For – Price, good software. **Against** – Acoustic, really best for Prestel use only. **Conclusion** – A bargain, ideal if you are working to a limited budget.

KDS Communicator 104

This modem was reviewed in the November issue of ACU. Then we said that it was quite a neat package let down by the software. Well since then KDS have improved on this aspect and the whole feel of the set-up has benefitted.

The Communicator plugs into the expansion port of a 464/664/6128, a lead runs from the modem to a standard BT telephone socket and a power supply is built into the 3-pin mains plug.

The KDS modem is the easiest system for the novice to use. It also has the greatest number of features. There are no knobs or switches on the front of the modem. The baud rate, parity and all the other setting up work is handled by the software.

This means that writing dedicated software, to run your own bulletin board for instance, is much easier with the Communicator than with a system made of component parts. All the software is in ROM, so you don't have to wait while it loads.

The Prestel emulator is pretty good. It will not handle all the dynamic frames on Prestel and cannot download telesoftware but it uses mode 0 to give all eight colours, has the easiest character set to read and is very fast.

Telesoftware downloading is planned and should be available very soon – we have no doubt it will work. As with the Cirkit set-up it is not possible to use the RS232 interface to drive other modems, printers or talk directly to other computers.

At £153 the KDS 104 offers a lot for the money but still falls a little short on the software side.

Summary

For – A complete system, easy to use. **Against** – Not BT approved. **Conclusion** – Ideal for the user who wants a simple way of getting on-line to a lot of systems.

Amstrad RS232

The official offering from Amstrad is designed to be simple to use. It is well packaged, with a good manual and the software in ROM. The RS232 specification stipulates a high power consumption, some interfaces will try to draw this current from the computer.

The ROM software uses the standard eight colour mode 0 approach but updates the screen in a funny way. It loops through a table of lines to be updated, making the changes when it gets to them. This means that you could miss some movements in a dynamic frame, although the end result will always be accurate.

There are no facilities for telesoftware downloading. The worst aspect of this software is the speed of the keyboard scan. There is quite a delay between you pressing a button on the keyboard and that character being sent to Prestel. If you log in at a time when Prestel is very busy the system becomes almost too slow to use.

The Amstrad RS232 has a host of RSXs. These make it easy for you to write your own little programs using the device. There is a special file transfer protocol which makes it easy to send programs to other Amstrad owners. The set-up on the front cover shows the Amstrad RS232 with a HoneyComm ROM inside, connected to the WS 3000. This is a very nice set-up but is very expensive and means opening up the RS232 case.

Summary

For – Amstrad name, powered hardware. **Against** – Slow Prestel, limited terminal. **Conclusion** – Only really suitable for control applications.

Skywave/Modem House

The Skywave serial interface has been around for a very long time, so it is surprising that we were told that we couldn't have one until the software was finished. It then transpired that Skywave, like KDS, prefer to carry on adding to their software, offering updates as and when customers want them. This works well if you handle the administration correctly and Skywave certainly seem to have their share of happy customers.

The interface works, but only from Amsdos. You cannot use any of the CP/M software designed to drive a serial device. It suffers from being in a box designed to fit on the back of a 464, so anyone with a 6128 will either have to rest the computer on a large book or use a Heath Robinson-type bodge which is sold by Skywave.

The software is in an on-board ROM. Written in Forth it uses a run-time interpreter and is tight on space and so Skywave are moving to a larger ROM. The software is very poor – its only saving grace is that it can download telesoftware. The Prestel uses mode 1 but without any stipples, it does not handle dynamic frames properly and would be almost impossible to use to send a mailbox with any detailed graphics.

Modem House are selling the Skywave interface with a Voyager 7 modem which they claim is BT approved. This is very hard to believe. Approval is very difficult to get – as the modem is too new to have gone through the tests it does not carry an approval sticker (this is an offence regardless of whether it is approved or not) and the Voyager 7 will auto-dial. BT are very fussy about people using auto-diallers which clog up their lines and getting approval for a system like this would take ages. At the Amstrad Show Modem House were using phoney green stickers which make a mockery of any attempt to regulate the use of modems.

The Voyager is very cheap – perhaps with the right software it would make a nice, if unapproved system. The Skywave interface is expensive and limited, it does offer a parallel port but this is not worth paying twice the price of a rival system for. The modem may be worth looking at, the interface isn't.

Summary

For – Not a lot. **Against** – Price, no Xmodem, no CP/M, crude. **Conclusion** – overpriced.



Honeysoft

Honeysoft is a small company which specialises in Amstrad software and peripherals. The quality of its work is second to none but building a system means that you need to know what you are doing.

A minimum system would consist of a serial interface, a modem from another manufacturer and the right software.

If you want to use ROM based software you will also need a ROM board. An ideal modem to use this with is the WS 3000 from Miracle Technology (shown on the front cover). The hardware does not need any power (although whichever modem you choose will probably have its own mains plug).

The Honeysoft software is undisputedly the best Amstrad comms software around. There are two programs, HoneyView and HoneyTerm, which together form HoneyComm.

HoneyView works with all the dynamic pages on Prestel and downloads telesoftware perfectly. There is a frame buffer which allows you to save and edit pages, store them and flip through when you come off line. All the controls are accessed through a series of menu windows.

You can define function keys to reduce the time it takes to get back to menus or pages you often select. If you send a lot of mailboxes you can use the function keys to hold strings of often-used phrases. You can load and save the key definitions to tape or disc.

To overcome the problem of producing a good eight colour 40-column display HoneyView offers a mode 0 display, like the Communicator, and a mode 1 display which gives more readable characters but doesn't look as good. In mode 1 you can choose the foreground colours and a stippling effect goes some way to producing the missing colours.

HoneyTerm emulates an Ampex terminal. This is VT100 compatible and should work with the majority of mainframe systems. It has some added features, the main one being a review mode. When text scrolls off the top of the screen a copy is kept in memory. You can have more than 10 screenfuls stored before it starts to delete the first stuff.

This buffer can be saved to disc and is very useful when using Gold. You can read a long letter and reply to any points in it by just swapping between the letter and your reply. You can send program files from one computer to another using the Xmodem standard or just a simple Ascii transfer for text. We regularly use HoneyTerm to send magazine articles from one place to another.

The overall package of a HoneySoft interface, Romboard and HoneyComm is certainly attractive, but the need to buy other bits separately and maybe make your own lead may put off some people. The lack of a case for the interface looks unprofessional.

Summary

For – The best software. **Against** – Fiddly to set up, expensive. **Conclusion** – Best bet for tekkies.

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for less than



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The PCW 8256 is more than a wordprocessor. It's also a purpose built computer with an enormous 256k memory.

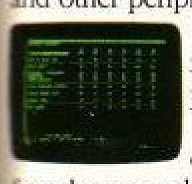
By employing the CP/M* Plus computer operating system with 61k TPA, it opens the door to over 8,000 commercial software packages. If that's

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ordprocessor, a typewriter.



not enough, for the real computer buff, a combination of the powerful Mallard basic, Dr Logo and GSX Graphics system extentions will mean you can write your own programs. There's also an optional combined serial and parallel interface, that gives you access to modem, additional printers and other peripherals. And you can even add an extra 1 M byte drive.



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Roland Takes a Running Jump



PART 4

Last month we produced the core of a game which ran and a program which allowed you to design screens for the game. Now it is time to see what makes 'Roland takes a running Jump' tick. Bytes by Keith Wilson and Marcus Sharp. Words by Peter Green.

Roland takes a running jump was written to include a set of nine sheets which make up a data file like the one you will have from the room designer program listed last month. We had intended to list these rooms this month but the program turned out to be so long that it would have taken over the magazine. As a compromise we have listed the source code, explaining how the machine code works and left the rooms out. If you want the original rooms then we will send you a copy of the listing. Just drop an SAE in the post to us and we will let you have a copy of a program to create the rooms.

Decoding the code

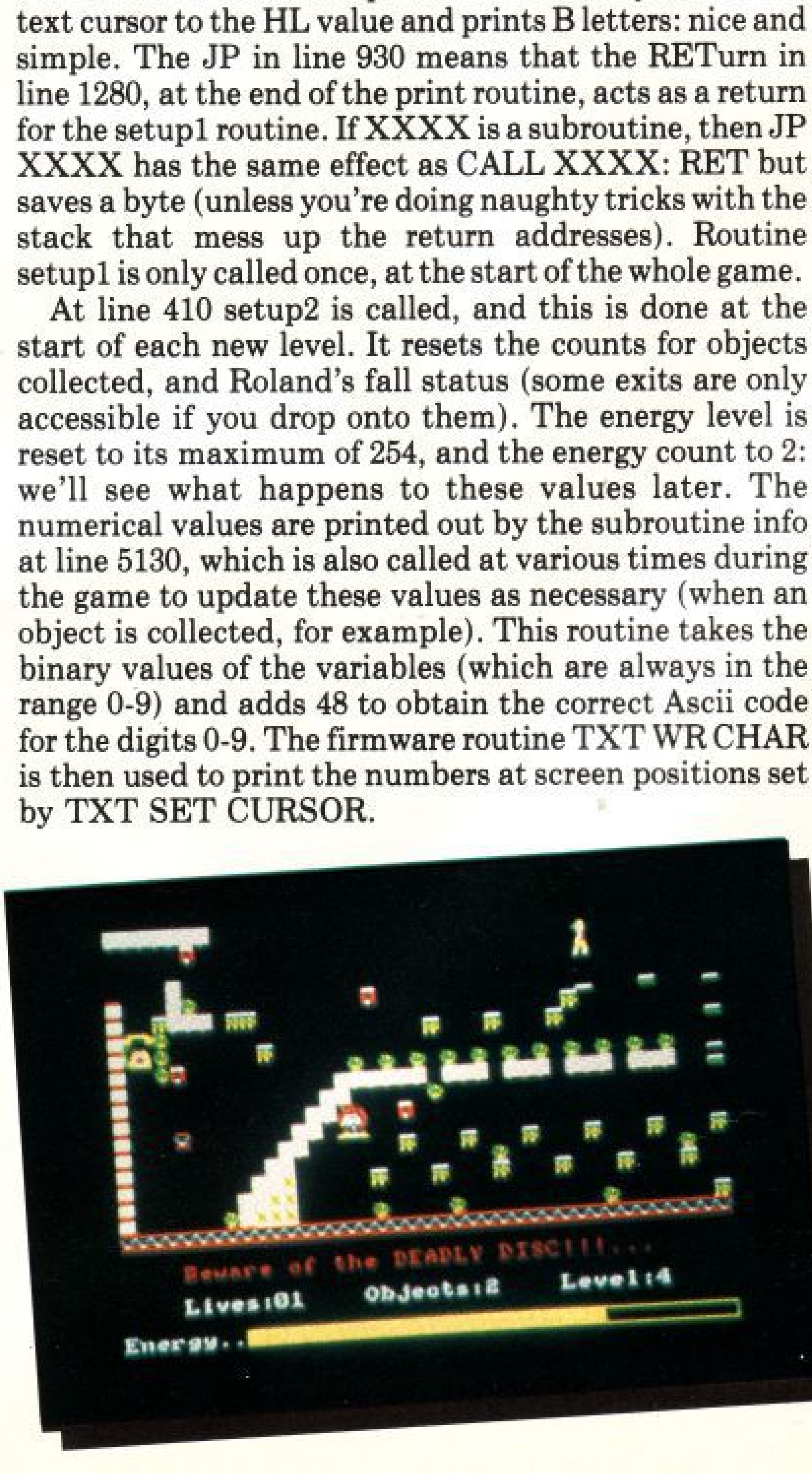
Normal people can stop reading now, and start typing: the rest of you masochists can carry on with the explanation of how the remaining machine code works. Listing 1 is the beast in question, and it is assembled at &8000: the data for all the levels is loaded at &4000. The total length of data for one floor is 820 bytes, consisting of the values for the three variable inks (six bytes), the start coordinates for Roland, two sets of monster data as described above, and the 760 bytes which hold the block map of the level.We now have a 40 by 19 play area, not 40 by 16. We managed to squeeze a bit more into the screen, which makes the design possibilities more versatile.

The entry point for the code is at line 400. We don't strictly need the ENT directive here, as the routine isn't self-running but is always called from the Basic program. Maxam users will have to drop it anyway because it isn't a recognised directive. They'll also need the dots in front of the labels print and end as these are reserved words.

The first set-up routine simply initialises the start level (this value is POKEd into place by the Basic program, allowing you to start at any point in the game), the number of lives (cheats can alter to suit), and the pointer to the data for the Roland sprite to be displayed (there are two, one facing left, the other right). The mode and border colour is set, INK 1 is set to white, the text pen is set to INK 1 and the four headings for the game information printed; that is, the number of lives left, the number of objects collected, the current level and the amount of energy Roland has left.

Each of these text strings is printed using the subroutine print, which is entered with HL containing the screen coordinates at which printing is to start, IX pointing to the first letter of the text, and B containing the number of letters to print. The routine just sets the text cursor to the HL value and prints B letters: nice and simple. The JP in line 930 means that the RETurn in line 1280, at the end of the print routine, acts as a return for the setup1 routine. If XXXX is a subroutine, then JP XXXX has the same effect as CALL XXXX: RET but saves a byte (unless you're doing naughty tricks with the stack that mess up the return addresses). Routine setup1 is only called once, at the start of the whole game.

At line 410 setup2 is called, and this is done at the start of each new level. It resets the counts for objects collected, and Roland's fall status (some exits are only accessible if you drop onto them). The energy level is reset to its maximum of 254, and the energy count to 2: we'll see what happens to these values later. The numerical values are printed out by the subroutine info at line 5130, which is also called at various times during the game to update these values as necessary (when an object is collected, for example). This routine takes the binary values of the variables (which are always in the range 0-9) and adds 48 to obtain the correct Ascii code for the digits 0-9. The firmware routine TXT WR CHAR is then used to print the numbers at screen positions set by TXT SET CURSOR.





Next, setup2 calls a firmware routine SCR FLOOD BOX to draw the rectangular strip that displays how much energy is left (line 1090). Then the routine is called that draws the background for this level onto the top 19 rows of the screen. This routine is called putbak and it starts at line 5320, but its action needs a lengthy explanation so we'll return to it later. After drawing the background, the counts for the path lengths of each monster are initialised from the monster data at m1 and m2 (lines 130-140). Finally the text pen is set to INK 1, and the Roland and monster sprites are drawn on-screen by the putrol and putmon routines. This concludes the setup2 routine.

Back to putbak

Now to cover the printing of the current background. First, putbak calculates where in the data table the 820 bytes for the current level can be found (lines 5320-5400). Then the values for the three variable INKs (0, 2 and 3) are obtained from the table and sent to the hardware using the firmware routine SCR SET INK (lines 5410-5570). This means each level can have its own colour scheme. Then the next 774 bytes of data are copied from the data table into the variable work area (lines 110-150). Next, the title for the screen is displayed, 40 characters (including leading and trailing spaces added by the screen designer program to centre it) which are printed underneath the playing area (lines 5650-5790).

Now the program has to place all the background graphics on the screen. It does this in a similar way to the sprite-drawing routine back in Part 1, by copying pre-encoded data directly into the screen RAM. Again, this allows multi-coloured characters to be displayed with the minimum of fuss. The screen data for the background blocks appears at lines 6570-6820 in the listing. The routine that puts a block on screen is called putblk (no kidding!) and starts at line 6010. It expects to find a block number in the A register, and the screen address of the top left-hand corner of the block in DE.

The action of putblk is as follows. After saving the HL and BC counters from putbak, the type of block is examined to calculate how far into the block data we have to index to find the right graphic. If the block is zero, representing empty space, we can skip the next bit of program because the index is zero (first entry in the block table). Otherwise, we check bit 7 and if it is not set, the floor isn't of the melting type. So we now go into a loop starting at bk_lp1, rotating the A register to the left and incrementing B (initially zero) until the carry is set. As you'll remember from Fig. 1 last month ordinary objects are represented by a single bit set in the block code. So once this loop terminates, B contains a number corresponding to the position of the block in the block table. For example, B is 2 for a thick floor, because a thick floor has the second bit from the left set.

Now B is put into the A register and multiplied by 16, because each graphic in the block table contains 16 bytes. At bk_lp3 this index value is moved into BC as a 16-bit unsigned number and added to the start of the block table in HL, to give the actual address for the graphic data. Finally the code at lines 6220-6350 transfer the graphic data into the screen, before restoring the saved registers and returning.

Suppose, however, that the block was a melting floor. Here we do something different, and slightly at variance with the information given in the December issue in Fig. 2. If bit 7 is set, it does mean that the floor is melting, but also that the whole block number is the complement (inverse) of an offset into the block graphic lookup table (that is, the offset which we had to calculate for all the other 'normal' blocks above). Line 6080 recovers this offset with a CPL command (this inverts all the bits in the A register), then jumps straight to the absolute address calculation at bk_lp3, line 6180.

The point of all this is that an 'unmelted' melting floor is stored with a character value of 239, &EF, or %11101111, which inverts to %00010000, or 16. This is the correct offset into the block character table for the melting floor graphic, so the whole graphic block gets printed. However, for each time period that Roland stands on a melting floor, 4 is added to the block number in the fldat work area. So the block numbers for a melting floor cycle through 239, 241, 245, 249 and 255. The inverse of these gives 16, 12, 8, 4 and 0, so as the floor melts, the table offset decreases: thus the block gets drawn as partly the empty space (the character before it in the table), and partly the melting floor graphic. This gives the effect of the floor gradually sinking, and when it is finally gone (value 255), the offset is zero, the whole of the space graphic is printed, and the floor is now just an empty space. Neat though this is, it does slightly complicate the 'see what's there' routines as both 0 and 255 represent empty air.

One last small point: Lines 5840-5870 aren't really necessary. They're there as a leftover from an early version of the screen designer program, which stored the block data as powers of two only. For the above system to work, a virgin melting floor block had to be converted from 128 to 239 in the fldat map. If you look at the final version of Designer (listed last month), line 270 does this conversion too.

The game of the name

And so to the main game loop for Roland (lines 420-610). First off, we count 14 TV frames to slow the game down to manageable speeds, then erase Roland (putrol does this job too because we're EXORing the screen: see Part 1 of the series). Next we look at a variable, jmpcnt. Roland's jump is split into two parts: the parabolic curve as he leaps into the air and falls back to the same level, and thereafter a vertical plunge (x velocity zero). This is not textbook physics but makes programming easier! The curved part is measured by jmpcnt: if Roland is moving up, there's no point in CALLing the joystick input and 'fallen to his death' routine (line 480 checks this). If Roland is moving downwards or on the level, this routine checks out what's underfoot and the state of the joystick, adjusts Roland's velocities accordingly (as we discussed last time), and kills Roland if he's fallen too far onto a solid surface.

If Roland isn't dead, the rest of the loop is straightforward. In turn, the program: moves Roland's coordinates; checks if Roland has hit a disc, the exit, a plant or one of the monsters, and if so deals with it; puts Roland back on screen at his new position; for smoothness, waits for the next flyback; erases the monsters; moves them on their predetermined paths; decreases the energy bar (killing Roland if time has run out); replaces the monsters in their new positions; checks if Roland has hit a monster (killing him if so); tests the ESC key and quits if it's pressed; and then loops back to the label 'game' to do it all again. Now we'll examine each of the routines mentioned above.

The fall guy

The cunning part of the rolacc routine (lines 1980-2760) was discussed in December. The additional lines you see here deal with melting floors and falling. Melting floors are handled by lines 2090-2240. First, if the floor block character from fldat is all 1s, ie wholly melted, it counts as empty space and a jump is made to the falling routine at line 2670. Otherwise the value of the A register is altered (by 4) to represent the next stage of the melting process, this value replaced in the fldat table, and the putblk routine used to draw the new floor graphic on screen.

If Roland is standing on solid ground, lines 2260-2300 check if he got there by falling more than four character heights. If he did, the death routine is invoked because he's broken his neck! Otherwise the fall counter is reset to zero. Finally, if Roland is dropping in free fall, the routine at line 2670 is used. The fall velocity is set at 1 (this is not the system suggested in part 2, with an accelerating drop, but makes the programming much easier). If Roland is falling back from the peak of his jump towards the level he started from, the routine quits here (so Roland also travels left or right if he was moving that way when he jumped). Otherwise, Roland is on the straight, vertical section of his fall, so the x velocity is zeroed in line 2730 and the fall count incremented.

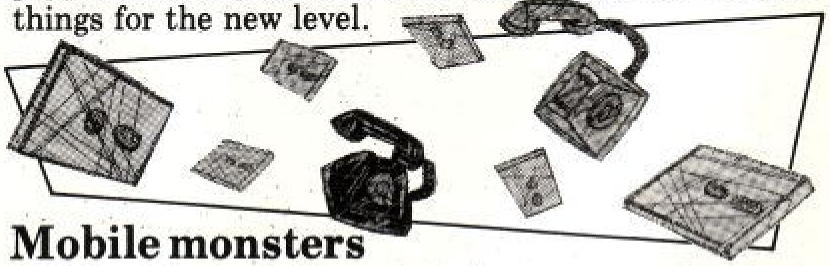
Move it all about

The Roland sprite movement routines at 3270-3780 are quite straightforward. Checks are made to prevent Roland moving off the right or left edges of the screen (lines 3300-3350 and 3470-3480). Then, the routine labelled 'find' is called to check the contents of the two locations Roland is attempting to move onto (as Roland is two characters high, remember): this is done at lines 3360-3460 and 3490-3580 for right and left movement respectively. Roland isn't allowed to move onto a solid block, or 'thick floor' as we've called it, which is indicated by bit 6 of the fldat entry being set to 1.

Finally, if the variable jmpcnt isn't zero, showing that Roland is jumping, its value is decremented.

Check it out

The check routines are equally straightforward. The find routine is used again to see what Roland is now actually touching (again, he covers two character positions). If bit 1 is set, a disc is being touched: lines 4420-4660 increase the object count and displays the change in the information box, makes a suitable sound, checks whether the disc was under Roland's head or feet, and removes it from the corresponding location on the screen. If a deadly plant is being touched, the death routine is invoked without further ado. Finally, if the exit is being touched, the object count is checked and, if all five discs have been collected, the level is incremented (wrapping back to 1 if we're on Level 9 already). The victory sound is made, there's a long pause, and the program jumps back to gm_lp1 to set up things for the new level.



Mobile monsters

The monsters move in straight lines and are able to cross over any type of background character, so their movement routine at lines 3830-4080 is quite simple. Each monster has its x and y positions altered by the magnitude of its x and y velocities. The count (which is the length of the monster's path) is decremented and, if it has reached zero the monster is at the end of its path. The count is reset to its start value and the x and y velocities have their directions reversed (using NEG), which sends the monster back in the other direction.

Energy losses

Decene, another simple routine at lines 1760-1930, knocks a strip one pixel wide off the end of the energy bar every two passes round the overall game loop (ecount counts the number of passes). As the strip starts out 254 pixels long, each level must be completed within 508 game loops (about one and a half minutes). If the time runs out, Roland croaks.

Touch and go

Finally, lines 4680-4900 check whether Roland is overlapping either of the monsters. For each monster, the routine compares Roland's x coordinate with the monster's. If it isn't either the same, or one larger (remember Roland is only one character wide, the monsters are two characters), then Roland can't be overlapping and the routine exits. Otherwise, at line 4800 the y coordinates are retrieved and a similar comparison made. A match here means Roland and a monster have at least one character position in common, and a jump is made to the death routine.

Listing 1

```
; ****** ROLAND TAKES A RUNNING JUMP ************
; ** Code by Keith Wilson & Marcus Sharp ********
; ***********************************************

    ORG &8000

bakdat      EQU     &4000   ;start of floor data
baklen      EQU     820     ;length of data for one floor
level       DEFB    0       ;current floor number
ry DEFB     0
rx DEFB     0       ;Roland's coordinates
m1 DEFS     6       ;monster 1's data
m2 DEFS     6       ;monster 2's data
fldat       DEFS    760     ;screen work space
count1      DEFB    0       ;monster 1's count
count2      DEFB    0       ;monster 2's count
rvy         DEFB    0
rvx         DEFB    0       ;Roland's x and y velocities
jmpcnt      DEFB    0       ;count for jumps
falcnt      DEFB    0       ;characters Roland has fallen
objcol      DEFB    0       ;number of objects collected
lives       DEFB    0       ;Roland's lives left
energy      DEFB    0       ;Roland's energy
ecount      DEFB    0       ;count for energy
rolspr      DEFW    0       ;Roland's sprite address

text1       DEFM    "Lives:0Objects:Level:Energy.."

                    ;table of sounds
sd_jmp      DEFB    1,1,1,48,1,0,15,30,0
sd_get      DEFB    4,1,0,100,0,0,15,60,0
sd_die      DEFB    135,0,0,0,9,15,14,200,0
sd_end      DEFB    135,0,1,48,1,0,14,150,0

;MAIN GAME LOOP

    ENT $
    CALL setup1     ;set up variables for start of game
gm_lp1      CALL setup2     ;set up more variables
game        LD B,14         ;count to slow the game down
gm_lp2      CALL &BD19      ;MC WAIT FLYBACK - wait for a frame flyback
    DJNZ gm_lp2     ;and again until count runs out
    CALL putrol     ;erase Roland
    LD A,(jmpcnt)
    SUB 3
    CALL C,rolacc   ;handle input if Roland's not going up
    CALL move       ;move the sprites
    CALL check      ;check for any special circumstances
    CALL putrol     ;print new Roland
    CALL &BD19      ;MC WAIT FLYBACK
    CALL putmon     ;erase the monsters
    CALL monmov     ;move the monsters
    CALL decene     ;decrease energy
    CALL putmon     ;print the monsters
    CALL monchk     ;check for Roland hitting a monster
    LD A,66         ;is the ESC key pressed?
    CALL &BB1E      ;KM TEST KEY
    JR Z,game       ;if not pressed, loop round
.end        JP &BB00        ;clear key buffer

;SET UP VARIABLES FOR GAME

setup1      LD A,1
    LD (level),A    ;set start level
    LD A,4
    LD (lives),A    ;set Roland's lives
    LD HL,rollft
    LD (rolspr),HL  ;set Roland's sprite address
    LD A,1
    CALL &BC0E      ;SCR SET MODE - select Mode 1
    LD BC,&0000
    CALL &BC38      ;SCR SET BORDER - to black
    LD A,1
    LD BC,&1A1A
    CALL &BC32      ;SCR SET INK - ink 1 = white
    LD A,1
    CALL &BB90      ;TXT SET PEN - to ink 1
    LD IX,text1     ;message text address
    LD B,7
    LD HL,&0517     ;data for 'Lives' text
    CALL print      ;print text
    LD B,8
    LD HL,&1117     ;data for 'Objects' text
    CALL print      ;print text
    LD B,6
    LD HL,&1E17     ;data for 'Level' text
    CALL print      ;print text
    LD B,8
    LD HL,&0119     ;data for 'Energy >'
    JP print        ;and print it

setup2      XOR A
    LD (objcol),A   ;set objects collected to 0
    LD (falcnt),A   ;reset fall count
    LD (jmpcnt),A   ;and jump count
    LD A,254
    LD (energy),A   ;set initial energy
    LD A,2
    LD (ecount),A   ;set energy count
    LD HL,rolrgt
    LD (rolspr),HL  ;set initial Roland sprite
    CALL info       ;print information
    LD C,255
    LD HL,51088     ;set up registers for
    LD DE,&4008     ;size and colour of energy bar
    CALL &BC47      ;SCR FLOOD BOX - paint energy bar
    CALL putbak     ;print the background
    LD A,(m1+4)
    LD (count1),A   ;start monster 1's count
    LD A,(m2+4)
    LD (count2),A   ;and same for monster 2
    LD A,1
    CALL &BB90      ;TXT SET PEN - to ink 1
    CALL putrol
    JP putmon       ;plot some dummy sprites
```



```
1190
1200
1210 ;PRINT A MESSAGE, LENGTH B, POSITION H,L AND WITH TEXT AT IX
1220
1230 .print     CALL &BB75      ;TXT SET CURSOR - set cursor position
1240 pr_lp1     LD A,(IX)       ;get character
1250    CALL &BB5A      ;and print it
1260    INC IX          ;increase pointer
1270    DJNZ pr_lp1     ;and carry on until all done
1280    RET
1290
1300
1310 ;XOR ALL SPRITES TO SCREEN
1320
1330 putrol     LD HL,(ry)      ;get Roland's coords
1340    CALL &BC1A      ;SCR CHAR POSITION - get screen address
1350    LD DE,(rolspr)  ;sprite address
1360    LD BC,&0210     ;sprite size
1370    JP plot         ;print the sprite
1380
1390 putmon     LD IY,m1
1400    CALL monplt     ;XOR monster 1
1410    LD IY,m2
1420 monplt     LD DE,64        ;size of each graphic
1430    LD HL,montab    ;start of graphics
1440    XOR A
1450    SBC HL,DE       ;minus one graphic
1460    LD B,(IY+5)     ;get monster graphic number in B
1470 mn_lp1     ADD HL,DE       ;add offset for 1 graphic
1480    DJNZ mn_lp1     ;for each monster number
1490    EX DE,HL        ;put graphic address in DE
1500    LD H,(IY+0)     ;get x coord.
1510    LD L,(IY+1)     ;get y coord.
1520    CALL &BC1A      ;SCR CHAR POSITION - find screen address
1530    LD BC,&0410     ;width and height of monster
1540 plot       PUSH BC         ;save width and row counter
1550    PUSH HL         ;save address of current row start
1560 do_row     LD A,(DE)       ;get byte of graphic data
1570    XOR (HL)        ;XOR it with the contents of screen
1580    LD (HL),A       ;put new screen data back into screen
1590    INC HL          ;step screen address right one byte
1600    INC DE          ;point to next byte of graphics data
1610    DJNZ do_row     ;loop back until whole row plotted
1620    POP HL          ;fetch screen address of row start
1630    LD BC,&800      ;offset of 2048 bytes to next row
1640    ADD HL,BC       ;add offset to screen address
1650    JR NC,no_cor    ;no carry, so no correction needed
1660    LD BC,&C050     ;correction factor for wrap-around
1670    ADD HL,BC       ;add correction
1680 no_cor     POP BC          ;fetch width and row counter
1690    DEC C           ;decrement row counter
1700    JR NZ,plot      ;loop back until all rows plotted
1710    RET
1720
1730
1740 ;DECREASE ENERGY BAR AND CHECK IF TIME HAS RUN OUT
1750
1760 decene     LD HL,ecount    ;point HL to energy counter
1770    DEC (HL)        ;decrease it
1780    RET NZ          ;if still some time left, return
1790    LD (HL),2       ;recharge count
1800    LD A,(energy)
1810    LD E,A
1820    LD D,0          ;put energy in DE
1830    LD HL,64
1840    ADD HL,DE       ;get x position
1850    EX DE,HL        ;put it into DE
1860    LD HL,1         ;start y coord.
1870    LD BC,6         ;end y coord.
1880    LD A,0          ;encoded ink
1890    CALL &BC62      ;SCR VERTICAL - remove pixels from end of e-bar
1900    LD HL,energy    ;point HL to energy left
1910    DEC (HL)        ;decrease it
1920    RET NZ          ;if still energy left, exit
1930    CALL dead       ;else kill Roland
1940
1950
1960 ;MOVE ROLAND ABOUT
1970
1980 rolacc     LD A,(rx)       ;get Roland's x coord.
1990    LD C,A          ;put it into C reg
2000    LD A,(ry)       ;get Roland's y coord.
2010    LD B,A          ;put it in B
2020    INC B
2030    INC B           ;go down 2 squares
2040    CALL peek       ;see what's there
2050    AND &EC         ;lose irrelevant bits
2060    JR Z,fall       ;if zero, then Roland is falling
2070    BIT 7,A
2080    JR Z,mr_lp1     ;if not on a sinking floor, exit
2090    CALL peek       ;re-check position
2100    AND 127
2110    CP 127
2120    JR Z,fall       ;if floor has sunk, fall too
2130    SET 7,A         ;make floor melting again
2140    ADD A,4         ;and move it down
2150    LD (HL),A       ;then put this in the map
2160    PUSH AF
2170    LD H,C
2180    LD L,B          ;put position into HL
2190    CALL &BC1A      ;SCR CHAR POSITION - and find its address
2200    EX DE,HL        ;put it into DE
2210    POP AF
2220    PUSH AF
2230    CALL putblk     ;and print the new floor
2240    POP AF
2250 mr_lp1     PUSH AF         ;push 'ground' onto stack
2260    LD A,(falcnt)   ;get fall count
2270    SUB 5
2280    JR NC,dead      ;if fallen more than 4, die
2290    XOR A
2300    LD (falcnt),A   ;else reset count
2310    CALL &BB24      ;KM GET JOYSTICK - test the joystick
2320    POP DE          ;pop 'ground' off stack into D
2330    LD HL,rvy       ;point HL to y velocity
2340    LD B,0          ;assume zero velocity to start with
2350    BIT 4,A         ;fire button pressed?
2360    JR Z,newrvy     ;if not, load y velocity with zero
2370    PUSH AF
2380    PUSH HL
2390    LD HL,sd_jmp
2400    CALL &BCAA      ;SOUND QUEUE - else make sound
2410    LD A,4
2420    LD (jmpcnt),A   ;set count for the jump
2430    POP HL
2440    POP AF
2450    LD B,-1         ;set jump velocity
2460 newrvy     LD (HL),B       ;store new y velocity
2470    LD E,A          ;store joystick byte
2480    OR D            ;merge with conveyor belt bits
2490    BIT 7,D
2500    JR Z,notmlt     ;if not on melting floor, skip over
2510    LD A,E          ;if so, only use left & right
2520 notmlt     AND &C          ;mask off unwanted bits
2530    LD HL,rvx       ;point HL to Roland's x velocity
2540    LD B,0          ;assume zero velocity to start with
2550    JP PE,newrvx    ;and load this if parity is even
2560    LD B,1          ;else load B with right x velocity
2570    LD DE,rolrgt
2580    LD (rolspr),DE  ;set sprite address
2590    CP 8            ;check if Roland is moving right
2600    JR Z,newrvx     ;and store this if he is
2610    LD B,-1         ;else make B=left velocity
2620    LD DE,rollft
2630    LD (rolspr),DE  ;set sprite address
2640 newrvx     LD (HL),B       ;store new x velocity
2650    RET
2660
2670 fall       LD A,1
2680    LD (rvy),A      ;set velocity for falling
2690    LD A,(jmpcnt)   ;get jumpcount
2700    AND A
2710    RET NZ          ;exit if jumping
2720    XOR A
2730    LD (rvx),A      ;zero x movement
2740    LD HL,falcnt    ;fall count address
2750    INC (HL)
2760    RET
2770
2780 peek       CALL locate
2790    LD A,(HL)
2800    RET
2810
2820 poke       CALL locate
2830    LD (hl),A
2840    RET
2850
2860 locate     PUSH AF         ;save AF
2870    PUSH BC         ;save x,y coords
2880    LD DE,40        ;width of one floor
2890    LD HL,fldat-40  ;point to 1 floor before level data
2900    INC B
2910 addrow     ADD HL,DE       ;add on row length
2920    DJNZ addrow     ;once for each row
2930    ADD HL,BC       ;add column number
2940    POP BC          ;restore BC
2950    POP AF          ;and AF
2960    RET             ;HL points to byte in fldat table
```

```
2970
2980 dead       CALL putrol     ;plot Roland
2990    POP HL
3000    POP HL          ;clear stack
3010    LD HL,sd_die
3020    CALL &BCAA      ;SOUND QUEUE - make dead noise
3030    LD A,1
3040    LD BC,&0119
3050    CALL &BC32      ;SCR SET INK - flash ink 1
3060    LD B,180        ;count for pause
3070 dd_lp1     CALL &BD19      ;wait for 1/50th second
3080    DJNZ dd_lp1     ;and repeat until count runs out
3090    LD A,1
3100    LD BC,&1A1A
3110    CALL &BC32      ;SCR SET INK - reset ink 1
3120    XOR A
3130    LD (falcnt),A   ;reset fall count
3140    LD A,(lives)    ;get lives left
3150    AND A
3160    JR Z,vdead      ;if none, he is kaput!
3170    DEC A
3180    LD (lives),A    ;else store new number of lives
3190    CALL info       ;and print them
3200    JP gm_lp1       ;and start again
3210
3220 vdead      JP end          ;clear key buffer
3230
3240
3250 ;MOVE SPRITES ABOUT
3260
3270 move       LD A,(rvx)      ;get Roland's x velocity
3280    AND A
3290    JR Z,mv_lp1     ;if he is still, skip over
3300    CP 1
3310    LD HL,rx        ;pointer to x coord.
3320    LD A,(HL)
3330    JR NZ,mv_lp3    ;skip over if not going right
3340    CP 39
3350    JR Z,mv_lp1     ;if already at boundary, ignore
3360    PUSH HL
3370    LD C,(HL)       ;get x coord.
3380    INC C           ;plus 1
3390    LD A,(ry)       ;and y coord.
3400    LD B,A
3410    CALL find       ;find out contents of new location
3420    POP HL
3430    BIT 6,A
3440    JR NZ,mv_lp1    ;if solid, ignore
3450    INC (HL)        ;else increase x coord.
3460    JR mv_lp1
3470 mv_lp3     AND A
3480    JR Z,mv_lp1     ;if already at boundary, ignore
3490    PUSH HL
3500    LD C,(HL)       ;get x coord.
3510    DEC C           ;minus 1
3520    LD A,(ry)       ;and y coord.
3530    LD B,A
3540    CALL find       ;get contents of new location
3550    POP HL
3560    BIT 6,A
3570    JR NZ,mv_lp1    ;if solid, ignore
3580    DEC (HL)        ;else decrease x coord.
3590 mv_lp1     LD A,(rvy)      ;get Roland's y velocity
3600    LD B,A
3610    LD A,(ry)       ;and his y coord.
3620    ADD A,B         ;add them
3630    PUSH AF
3640    LD B,A
3650    LD A,(rx)       ;get x coord.
3660    LD C,A
3670    CALL find       ;find what is there
3680    BIT 6,A
3690    POP BC          ;get new y back in B
3700    JR NZ,mv_lp4    ;if solid, go and check count
3710    LD A,B
3720    LD (ry),A       ;else store the result
3730 mv_lp4     LD HL,jmpcnt    ;jump count address
3740    LD A,(HL)       ;get the jump count
3750    AND A
3760    RET Z           ;if it's zero, exit
3770    DEC (HL)        ;else decrease the count
3780    RET
3790
3800
3810 ;MOVE THE MONSTERS
3820
3830 monmov     LD IY,m1
3840    LD HL,count1
3850    CALL movmon     ;move monster 1
3860    LD IY,m2
3870    LD HL,count2
3880 movmon     LD A,(IY+0)     ;get x coord.
3890    LD B,A
3900    LD A,(IY+2)     ;and x movement
3910    ADD A,B         ;add them
3920    LD (IY+0),A     ;and store the result
3930    LD A,(IY+1)     ;get y coord.
3940    LD B,A
3950    LD A,(IY+3)     ;and y movement
3960    ADD A,B         ;add them
3970    LD (IY+1),A     ;and store that
3980    DEC (HL)        ;decrease count
3990    RET NZ          ;and exit if still OK.
4000    LD A,(IY+4)
4010    LD (HL),A       ;else restart the count
4020    LD A,(IY+2)
4030    NEG
4040    LD (IY+2),A     ;reverse x direction
4050    LD A,(IY+3)
4060    NEG
4070    LD (IY+3),A     ;reverse x direction
4080    RET
4090
4100
4110 ;TEST FOR EXIT, DEADLY OR COLLECTING A DISC
4120
4130 check      LD A,(rx)       ;get Roland's x coord.
4140    LD C,A
4150    LD A,(ry)       ;and his y coord.
```



```
4160     LD B,A
4170     CALL find
4180     LD HL,objcol      ;set objects collected pointer
4190     BIT 1,A
4200     CALL NZ,disc      ;if a treasure, go to routine
4210     BIT 4,A
4220     CALL NZ,dead      ;if a deadly object, die!
4230     BIT 0,A
4240     RET Z             ;exit if not an exit?!?
4250     LD A,(HL)         ;else get object collected count
4260     CP 5
4270     RET NZ            ;exit if not all collected
4280     LD A,(level)      ;else get level number
4290     INC A             ;increase it
4300     CP 10
4310     JR NZ,ch_lp1      ;if a legal level, store it
4320     LD A,1            ;else back to screen 1
4330 ch_lp1     LD (level),A      ;store the level
4340     POP HL            ;clear the stack
4350     LD HL,sd_end
4360     CALL &BCAA        ;SOUND QUEUE - make sound
4370     LD B,130
4380 ch_lp2     CALL &BD19        ;wait for a flyback
4390     DJNZ ch_lp2       ;until loop runs out
4400     JP gm_lp1         ;and use the new screen
4410
4420 disc       INC (HL)          ;increase objects collected
4430     PUSH BC           ;store coords.
4440     CALL info         ;print information
4450     LD HL,sd_get
4460     CALL &BCAA        ;SOUND QUEUE - make sound
4470     POP BC            ;restore coords.
4480     CALL peek         ;check bottom position
4490     BIT 7,A
4500     JR NZ,ds_s1       ;if melting floor, ignore
4510     BIT 1,A
4520     JR Z,ds_s1        ;if no treasure, ignore
4530     JR remchr
4540 ds_s1      DEC B             ;get head's position
4550     CALL peek         ;check top position
4560     BIT 7,A
4570     RET NZ            ;if melting floor, ignore
4580     BIT 1,A
4590     RET Z             ;if no treasure, ignore
4600 remchr     LD (HL),0         ;remove treasure from map
4610     LD H,C
4620     LD L,B            ;put coords. in H,L
4630     CALL &BC1A        ;SCR CHAR POSITION - get screen address
4640     EX DE,HL
4650     XOR A
4660     JP putblk         ;and remove the treasure from screen
4670
4680 monchk     LD HL,(m1)        ;get monster 1's coords.
4690     CALL moncol       ;check for collision with monster 1
4700     LD HL,(m2)        ;get monster 2's coords.
4710     CALL moncol       ;check for collision with monster 2
4720     RET
4730
4740 moncol     LD A,(rx)         ;get Roland's x coord.
4750     CP L
4760     JR Z,mc_s1        ;if same as monster's, go ahead
4770     INC L
4780     CP L              ;now test for being one along
4790     RET NZ            ;and exit if not the same
4800 mc_s1      LD A,(ry)         ;get Roland's y coord.
4810     CP H
4820     JP Z,dead         ;if same as monster's, die
4830     INC H
4840     CP H
4850     JP Z,dead         ;if same as monster's + 1, die
4860     DEC H
4870     INC A
4880     CP H
4890     JP Z,dead         ;if same as monster's-1, die
4900     RET
4910
4920
4930 ;FIND OUT WHAT ROLAND IS ON (NEEDS COORDS C,B)
4940
4950 find       CALL peek         ;get first byte
4960     BIT 7,A
4970     CALL NZ,zeroa     ;if melting floor, ignore
4980     PUSH AF           ;store it
4990     INC B
5000     CALL peek         ;get next byte
5010     POP DE            ;get old byte in D
5020     BIT 7,A
5030     CALL NZ,zeroa     ;if melting floor, ignore
5040     OR D              ;merge the two
5050     RET
5060
5070 zeroa      XOR A     ;make A=0
5080     RET
5090
5100
5110 ;PRINT LIVES, OBJECTS AND LEVEL AT BOTTOM OF SCREEN
5120
5130 info       LD HL,&0C17
5140     CALL &BB75        ;TXT SET CURSOR - set cursor for lives
5150     LD A,(lives)
5160     ADD A,48          ;convert to ASCII code
5170     CALL &BB5D        ;TXT WR CHAR - and print it
5180     LD HL,&1917
5190     CALL &BB75        ;TXT SET CURSOR - for objects
5200     LD A,(objcol)
5210     ADD A,48          ;convert to ASCII code
5220     CALL &BB5D        ;TXT WR CHAR - and print it
5230     LD HL,&2417
5240     CALL &BB75        ;TXT SET CURSOR - for level
5250     LD A,(level)
5260     ADD A,48          ;convert to ASCII code
5270     JP &BB5D          ;TXT WR CHAR - and print it
5280
5290
5300 ;PRINT THE CURRENT BACKGROUND
5310
5320 putbak     LD HL,bakdat      ;get start of floor data
5330     LD DE,baklen      ;get length for one floor's data
5340     XOR A             ;reset carry
5350     SBC HL,DE         ;find address of one floor before start
5360     LD A,(level)      ;get floor number
5370     LD B,A            ;use it as a count
5380 pb_lp1     ADD HL,DE         ;find address of next floor
5390     DJNZ pb_lp1       ;loop until at correct floor
5400     PUSH HL
5410     POP IX            ;put address in IX
5420     XOR A
5430     LD C,(IX+0)
5440     LD B,(IX+1)       ;get ink 0 colour
5450     CALL &BC32        ;SCR SET INK - and set it
5460     INC IX
5470     INC IX
5480     LD A,2
5490     LD C,(IX+0)
5500     LD B,(IX+1)       ;get ink 2 colour
5510     CALL &BC32        ;SCR SET INK - and set it
5520     INC IX
5530     INC IX
5540     LD A,3
5550     LD C,(IX+0)
5560     LD B,(IX+1)       ;get ink 3 colour
5570     CALL &BC32        ;SCR SET INK - and set it
5580     INC IX
5590     INC IX
5600     PUSH IX
5610     POP HL
5620     LD DE,ry
5630     LD BC,774
5640     LDIR              ;store other variables and working map
5650     PUSH HL
5660     LD A,2
5670     CALL &BB90        ;TXT SET PEN - set pen ink to 2
5680     LD HL,&0115
5690     CALL &BB75        ;TXT SET CURSOR -set cursor position
5700     POP HL
5710     LD B,40
5720 pb_lp4     LD A,(HL)         ;get character from the title string
5730     PUSH HL
5740     PUSH BC           ;save registers
5750     CALL &BB5D        ;TXT WR CHAR - print the character
5760     POP BC
5770     POP HL            ;restore registers
5780     INC HL            ;increase pointer
5790     DJNZ pb_lp4       ;and loop back until finished
5800     LD HL,fldat       ;start of map data
5810     LD DE,&C000       ;start of screen
5820     LD BC,40*19       ;size of screen
5830 pb_lp2     LD A,(HL)         ;get block type
5840     BIT 7,A           ;test if a melting floor
5850     JR Z,pb_lp3       ;jump if not
5860     LD A,239
5870     LD (HL),A         ;else change to correct block code
5880 pb_lp3     CALL putblk       ;print the block
5890     INC HL            ;point to next block
5900     INC DE
```


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```
5910     INC DE          ;increase screen address
5920     DEC BC
5930     LD A,B
5940     OR C            ;check if BC=0
5950     JR NZ,pb_lp2    ;and loop back if not
5960     RET
5970
5980
5990 ;PUT BLOCK A TO SCREEN AT ADDRESS DE
6000
6010 putblk     PUSH HL
6020     PUSH BC         ;save counts
6030     AND A           ;check if block is a space
6040     JR Z,bk_lp2
6050     BIT 7,A         ;check for a melting floor
6060     LD B,0
6070     JR Z,bk_lp1     ;jump if not
6080     CPL             ;get offset for floor
6090     JR bk_lp3       ;and go and print it
6100 bk_lp1     INC B           ;increase count
6110     RLCA            ;rotate high bit into carry
6120     JR NC,bk_lp1
6130     LD A,B
6140 bk_lp2     RLCA            ;A contains table index
6150     RLCA
6160     RLCA
6170     RLCA            ;multiply by 16 (length of a block)
6180 bk_lp3     LD C,A
6190     LD B,0
6200     LD HL,blocks    ;start of block data
6210     ADD HL,BC       ;HL points to start of correct entry
6220     PUSH DE         ;save screen address
6230     PUSH DE
6240     POP IX          ;move it to IX register
6250     LD B,8          ;row count
6260     LD DE,&0800     ;displacement between rows
6270 bk_lp4     LD A,(HL)       ;fetch data byte
6280     LD (IX+0),A     ;plot to screen
6290     INC HL
6300     LD A,(HL)
6310     LD (IX+1),A     ;and next byte
6320     INC HL
6330     ADD IX,DE       ;move down a row
6340     DJNZ bk_lp4     ;and repeat until all printed
6350     POP DE
6360     POP BC
6370     POP HL
6380     RET
6390
6400
6410 ;PUT A BLOCK ON THE SCREEN (FOR USE BY THE ROOM DESIGNER)
6420
6430 tstput     LD A,0          ;set block type
6440     LD HL,&0000     ;set screen position
6450     PUSH AF
6460     CALL &BC1A      ;SCR CHAR POSITION - get screen address
6470     POP AF
6480     EX DE,HL        ;put address into DE
6490     JP putblk       ;and print the character
6500
6510
6520 DEFM       "WRITTEN BY KEITH WILSON AND MARCUS SHARP"
6530
6540
6550 ;BLOCK CHARACTER TABLE
6560
6570 blocks     DEFB &00,&00,&00,&00,&00,&00,&00,&00
6580     DEFB &00,&00,&00,&00,&00,&00,&00,&00    ;SPACE
6590
6600     DEFB &F0,&F0,&F0,&F0,&AA,&AA,&55,&55
6610     DEFB &CC,&CC,&33,&33,&CC,&CC,&CC,&CC    ;MELTING FLOOR
6620
6630     DEFB &F0,&F0,&1E,&87,&F0,&F0,&C3,&0F
6640     DEFB &F0,&F0,&0F,&69,&F0,&F0,&3C,&0F    ;THICK FLOOR
6650
6660     DEFB &0F,&0F,&0F,&0F,&80,&10,&40,&20
6670     DEFB &20,&40,&10,&80,&0F,&0F,&0F,&0F    ;THIN FLOOR
6680
6690     DEFB &55,&00,&22,&AA,&AA,&CC,&AA,&99
6700     DEFB &44,&AA,&55,&22,&33,&CC,&11,&00    ;DEATH OBJECT
6710
6720     DEFB &0F,&0F,&0F,&0F,&F4,&F4,&F2,&F2
6730     DEFB &F1,&F1,&F2,&F2,&F4,&F4,&0F,&0F    ;CONVEYOR-RIGHT
6740
6750     DEFB &0F,&0F,&0F,&0F,&F2,&F2,&F4,&F4
6760     DEFB &F8,&F8,&F4,&F4,&F2,&F2,&0F,&0F    ;CONVEYOR-LEFT
6770
6780     DEFB &78,&E1,&78,&E1,&0F,&0F,&0E,&07
6790     DEFB &0E,&07,&0F,&0F,&1E,&87,&1E,&87    ;TREASURE
6800
6810     DEFB &F0,&F0,&B3,&DE,&D5,&BE,&E6,&7E
6820     DEFB &E7,&76,&D7,&BA,&B7,&DC,&F0,&F0    ;OPEN EXIT
6830
6840 rollft     DEFB &00,&CC,&11,&EE,&77,&EE,&10,&60
6850     DEFB &10,&E0,&00,&C0,&01,&0E,&03,&C2
6860     DEFB &12,&86,&30,&0E,&33,&EE,&33,&EE
6870     DEFB &77,&77,&77,&77,&60,&30,&E0,&70    ;ROLAND FACING LEFT
6880
6890 rolrgt     DEFB &33,&00,&77,&88,&77,&EE,&60,&80
6900     DEFB &70,&80,&30,&00,&07,&08,&34,&0C
6910     DEFB &16,&84,&07,&C0,&77,&CC,&77,&CC
6920     DEFB &EE,&EE,&EE,&EE,&C0,&60,&E0,&70    ;ROLAND FACING RIGHT
6930
6940 montab     DEFB &00,&07,&0C,&00,&01,&0C,&08,&08
6950     DEFB &03,&08,&0E,&0C,&05,&0F,&06,&0E
6960     DEFB &06,&0D,&0F,&06,&0B,&78,&69,&0F
6970     DEFB &0F,&C0,&90,&08,&0D,&E0,&80,&0F
6980     DEFB &16,&F0,&F0,&83,&16,&70,&30,&06
6990     DEFB &03,&40,&00,&0E,&01,&00,&C0,&0C
7000     DEFB &00,&08,&01,&08,&11,&CC,&02,&00
7010     DEFB &FF,&FC,&F1,&EE,&FF,&FE,&F1,&FF    ;ALAN SUGAR MONSTER
7020
7030     DEFB &11,&FF,&FF,&88,&77,&FF,&FF,&EE
7040     DEFB &FF,&88,&11,&FF,&FF,&00,&00,&FF
7050     DEFB &FF,&00,&00,&FF,&44,&00,&00,&00
7060     DEFB &22,&00,&00,&00,&44,&22,&22,&00
7070     DEFB &88,&77,&FF,&00,&44,&FE,&F3,&88
7080     DEFB &88,&ED,&3D,&88,&55,&CB,&1E,&CC
7090     DEFB &99,&CB,&1E,&CC,&55,&ED,&3D,&CC
7100     DEFB &77,&FE,&F3,&CC,&11,&FF,&FF,&CC    ;TELEPHONE
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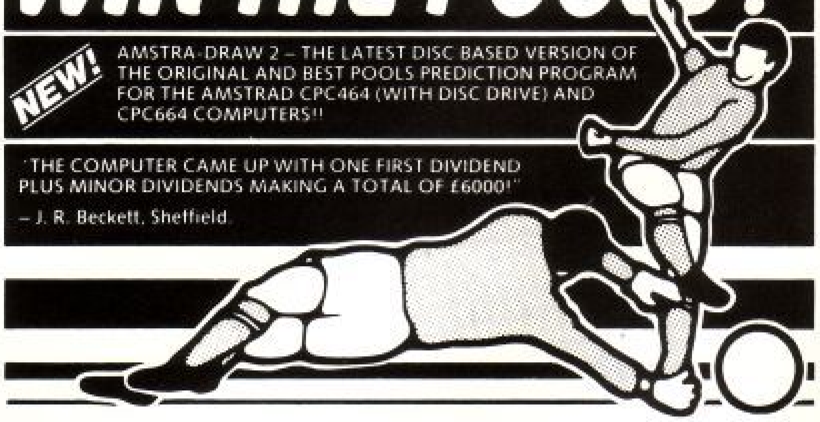
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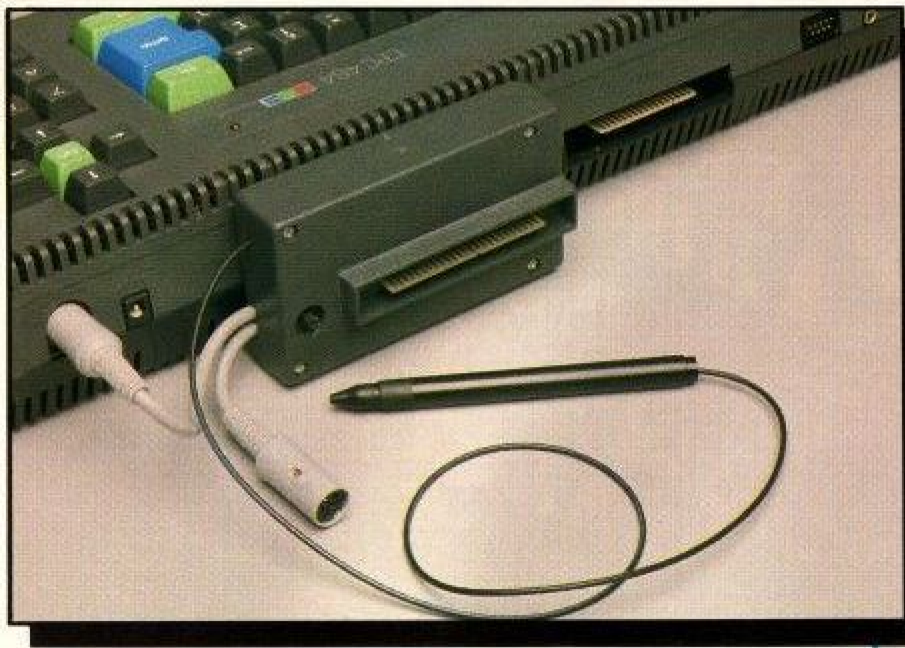
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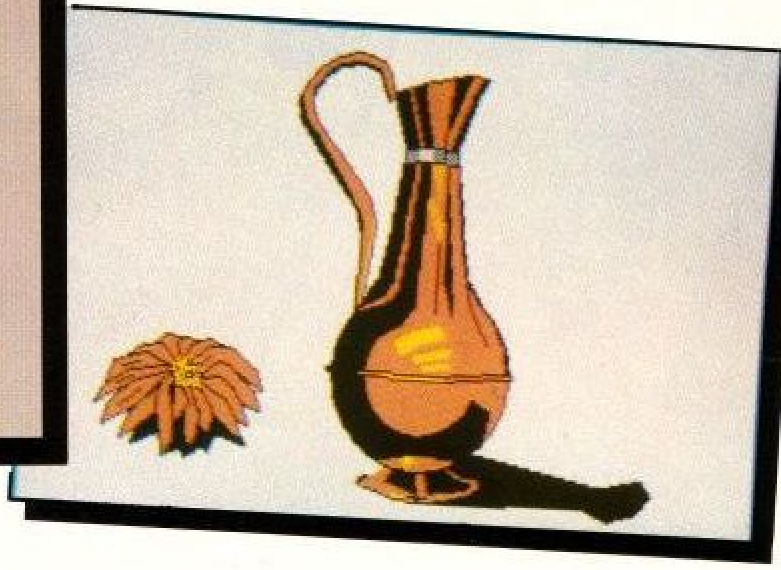
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Dart's pen of many colours

Is the newest light pen the best? VAX draws his own conclusions

Dart Electronics have produced a very unusual light pen, partly because the pen is connected to the electronics by a piece of optical fibre instead of the traditional piece of wire and partly because it is really 'pixel accurate', without the use of a nudge control.

A good test for a light pen is to write your name with it (if you can't spell your own, write somebody else's). Impossible on the Trojan/Amstrad one. Possible on the DK'tronics version, and a doddle (doodle?) on the Dart.

Simple software

Most of what makes a lightpen is the drawing software that comes with it. I have to say that although the program is not as flash as the DK'tronics version, the performance of the pen more than makes up for it. Dart expect to have some new software very soon.

Your main screen is totally reserved for drawing on, no status lines, flashing borders or stuff like that in sight. The options are on a separate menu page, revealed by pressing 'M' (I just love these mnemonic keystrokes, don't you?). Here is where you select your weapon: spray gun, thick to thin line or italic. You can also pick an elastic function. Nothing to do with maths, this is ye famous indecisive line/box/circle routine. You know, the one where you get to change the size of the shape before committing it to your masterpiece. Curved lines would have been nice, but if you want that degree of sophistication, I recommend a Macintosh or similar with something more accurate than a light pen. A magnify option would have really made an improvement though. I only ask for blood . . .

Changing modes is also done from the menu. The fascinating bit is that it doesn't wipe the screen when you change mode. Drawing a picture with a thick pen in mode 1 and then changing to mode 0 produces psychedelic, if unpredictable, results.

There is no patterned fill, but the ordinary fill works fine and is almost as fast as the Amstrad one. Beware the unfill though, this is not an oh-blast-give-me-the-old-one-back routine, it does a fill with the background colour (invariably white, you can't change it). If your work of art filled around a block of the same colour as you were filling in, this will be wiped out too. The first time this happened, the air around the computer was filled in deep blue in Anglo-Saxon style.

If you need a repeating pattern on the picture there are some technicolour sprites which you define yourself and plonk on the screen.

Draw backs

This pen is not without its limitations. One great gaff I noticed is that it is impossible to adjust the sensitivity of the pen with the disc drive on. The reason for this is simple. There is an edge connector out the back of the lightpen box. This is also where the sensitivity knob lives. How you reach the knob with an interface attached is left as an exercise to the reader.

Drawing anything on a dark background is almost impossible. To do it, you must change the colour of the ink to something more garish while drawing and change back again when finished. A similar problem exists when filling in the individual dots on sprites. Sometimes the pen does not want to know where to go, and there is just no way round it in some cases.

This pen works quite happily on green screen or colour monitors, even on televisions using an MP1 and a bit of knob twiddling (this is when I discovered the position of the sensitivity control). Spray-painting confuses heck out of most colour TV's though, even if the light pen does work properly.

Documentation is brief and to the point. It covers all the aspects of setting up and making a disc copy of the software that is provided with the pen on tape. Instructions are also given on how to use the pen in your own programs using a part of the code provided to find the spot on the screen the pen is pointing at.

In all, the product is worth the few extra nicker that it costs over the competition.

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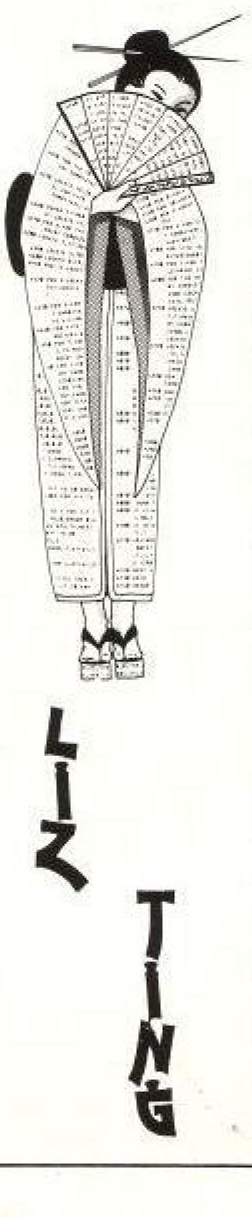
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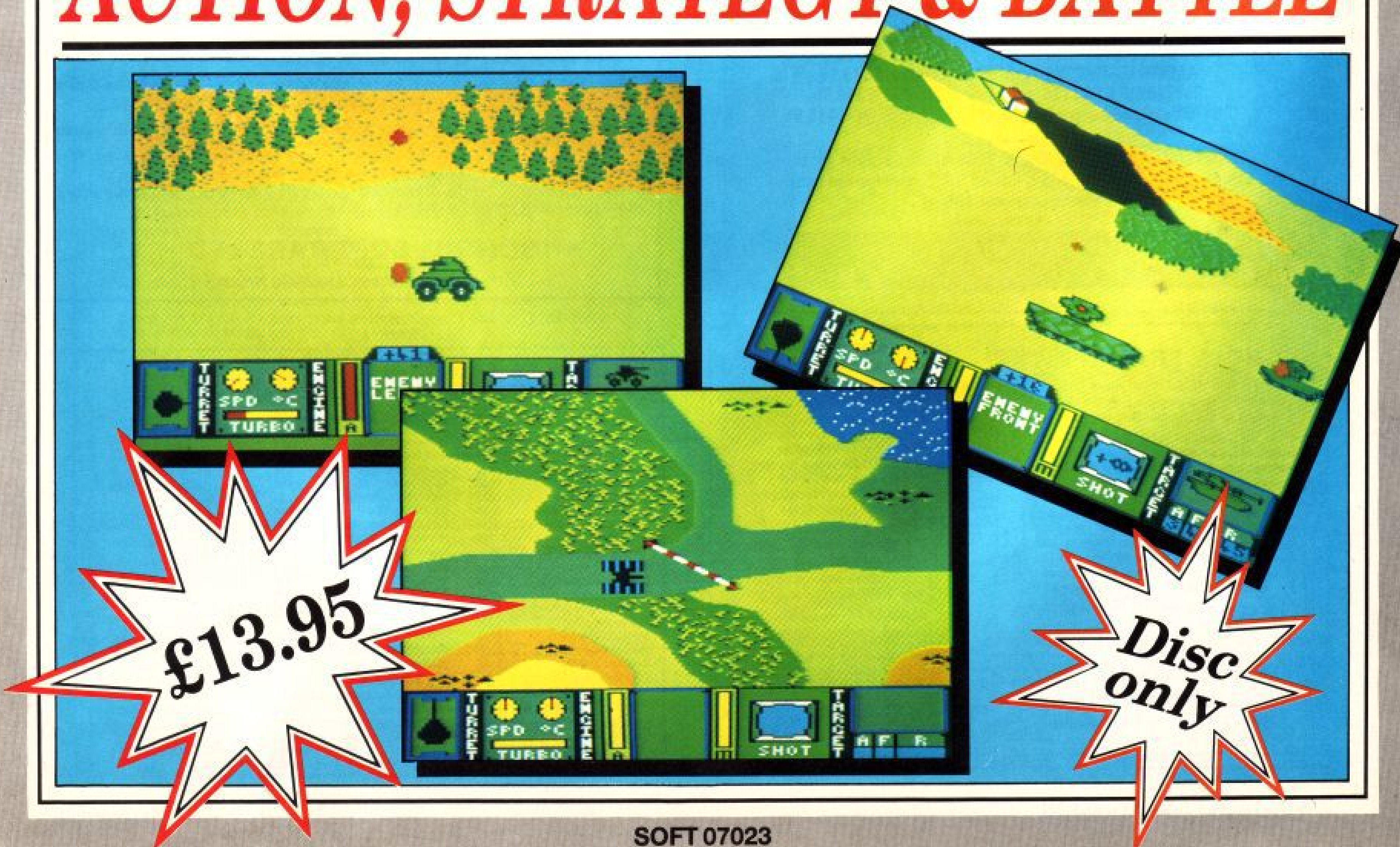
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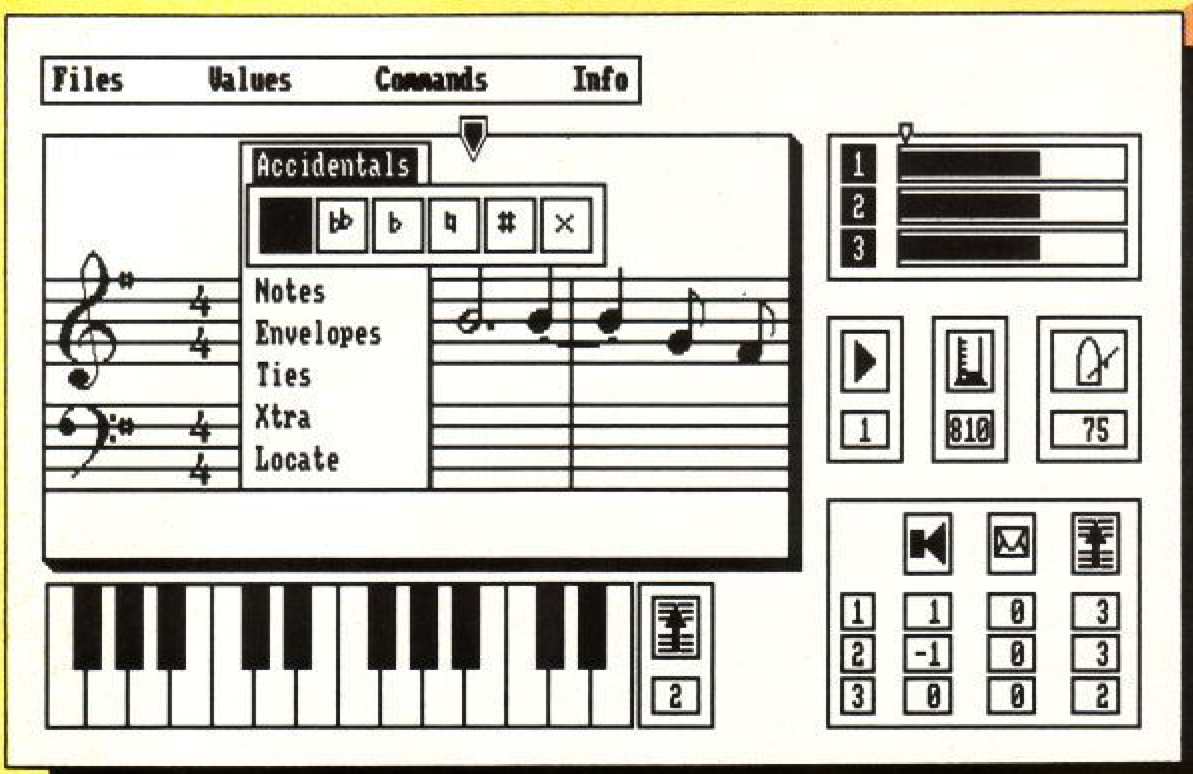
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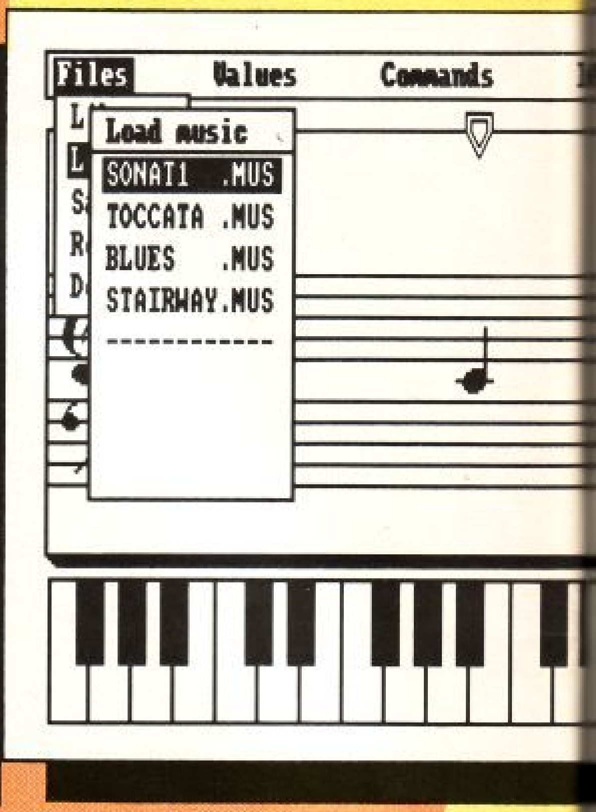
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Musical Marvel!

The musical capabilities of Amstrad are often overlooked but The Music System from Rainbird may put an end to that. Simon Rockman puts it to the test.

The Music System (TMS) is a composing utility which allows you to enter notes from the keyboard and play them back. Ideal for a budding Paul McCartney. The key to the system is simplicity of operation, it is designed to be a word processor for music, full of options, trendy pop-down menus and windows. There is no facility for mouse control, although this may be incorporated in the next Rainbird product – the Art Studio.

To get the most from a complicated program you need a comprehensive manual. TMS comes with a 64 page ring bound book which folds flat, making it easy to read as you experiment. The most valuable page is the quick key reference. The manual has been prepared on an Apple Macintosh and typeset using a laser printer which gives it a nice open feel. There are plenty of diagrams and it is easy to follow.

Getting started

The best way to get to grips with TMS is to dive in and get started. The tape version has a fast loader, but as the program is quite large it takes a little while to load so you get a pretty title screen (with a very nice Rainbird logo) to stare at while you wait. Once the program has loaded you can select the colours used by the system. The whole program runs in mode 2.

All the modules are displayed the whole time. As you step around them the one you have selected is highlighted by a shadow behind the relevant menu. The ESCape key moves you back to a previous level from any menu or sub-menu. This can be used as a panic button if you end up in a situation you can't get out of.

A metronome controls the speed at which the music plays. The sequencer can be used to override envelopes. One feature which is new to the Amstrad version of TMS is relative volumes for the voices. In earlier versions you had to do some quite complicated filtering to make one voice louder than the rest.

Music is best entered by using the keyboard mode. This allows you to use the qwerty keyboard as though it were a piano. This is done in real time, so you really need to be both a pianist and a typist to be efficient. The keyboard speed can be set to a beginners level. Only a crochet at a time, but you still need to know what you are doing. The only way to master the keyboard option is to practice.

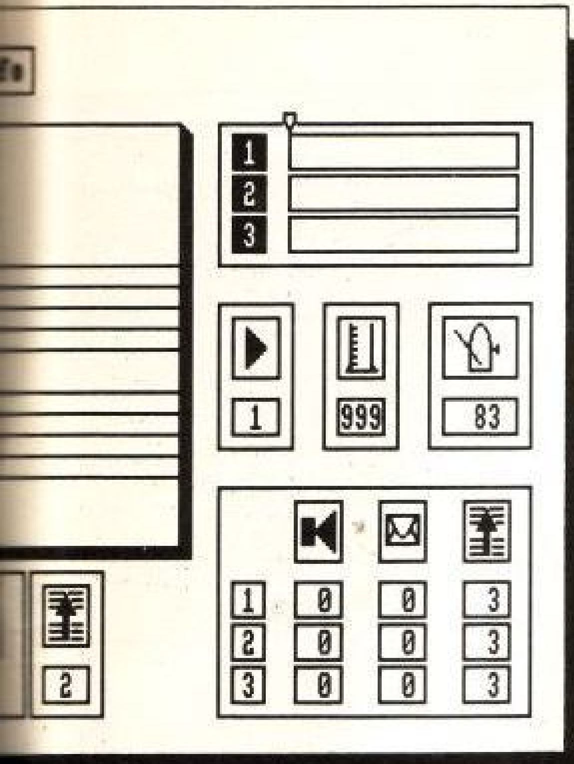
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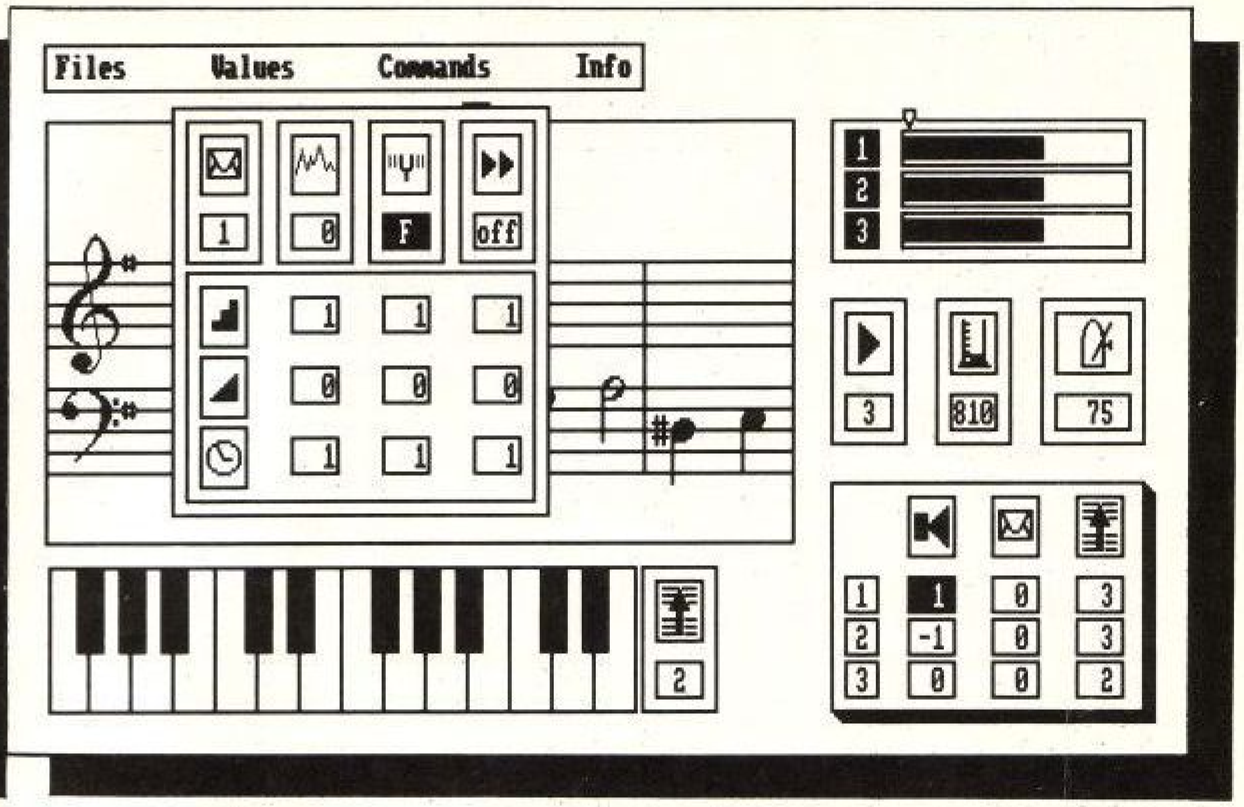
Those of us with less agile fingers will have to use the editor. Even the best computer pianist will probably spend as much time editing the score as entering it. The editor gives you access to file handling. Both the tape and disc versions support disc and tape storage. The file handling commands allow you to load, save, delete and catalogue your files. The load command lets you choose files from a menu, none of the usual "what did I call that file?" problems.

You can play a tune with or without the bars scrolling by. This is especially useful if you want to spot a bum note, although you can only view one voice at a time. You can elect to listen to individual channels or mix them and play at being Paul Hardcastle.

Entering notes is a doddle. You are given a default note in a default position on the stave. The note can be moved up or down on the stave to change the pitch, sharpened or flattened. The length of the note can be selected from a menu. This includes dotted notes. Using TMS is an ideal way to learn musical notation, a sort of learn by doing system. You can set up a note, listen to it and decide if that is what you want. When you add notes the last note (the one you are fiddling with) is not entered until you press return. A pointer along the top of the stave shows whether the note has been entered or is a 'phantom' note. You can toggle between a note and a rest by just pressing the spacebar.

There is room for 999 notes per voice. A thermometer-like device shows how much room is left for each voice. This magnifies the amount consumed until the memory is half full. So although the





meter initially appears to drop rapidly there really is a lot of room.

Bach to the keyboard

The Amstrad has a four octave range but the keyboard is only wide enough for typing two octaves at a time. To solve this problem the computer keyboard is used as a 'window' which scrolls up and down the octaves. If you cannot type as fast as you want to play you can enter the music at a slow speed and then speed up the playback. This can be done either using the metronome (a French elf who lives on the Paris tube) or by selecting the name for a particular speed, given in Italian (this really is educational isn't it?).

Editing music can cause the timing to be thrown out of line with the number of beats in the bar. This is set up at the beginning of the session and governs the speed of the whole thing. You can go through checking that the bars are OK automatically. The program will either give you the message "Good news – All OK" or stop at the error so that you can tidy it up.

As with a word processor you can cut and paste phrases. There is a scratchpad for you to copy stuff into which can then be written out onto another part of the stave. This makes it very easy to write music which all sounds the same, because it is the same. Perhaps Barry Manilow has got a Music System?

How to Handel emphasis

The Music System has a very flexible set of envelopes. You can define up to eight and swap them in the middle of the music. This makes even a short phrase cut and pasted a few times with a load of different envelopes sound great. Of course it is just as easy to make it sound dreadful, but then you can't expect artistic appreciation from a computer.

You can give an accent to whole bars. This makes a bar louder or softer at the beginning. It allows a sort of envelope within an envelope.

Free tunes

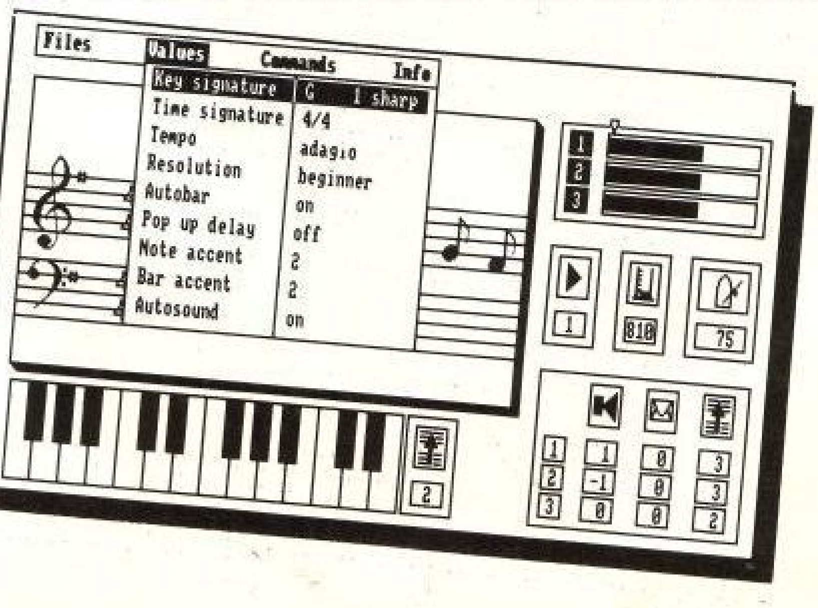
Each copy of TMS has a set of sample tunes. These have all been written for Rainbird so that there is no copyright problem. It would have been very useful if Rainbird had produced a run-time module so that you could compose your tune and then use that data file to make the tune run from within a game of your own, but that would have required you to use code written by Rainbird which they want to retain the copyright to. It would also mean that you would have to write your program around their routines, something that most professional programmers would object to doing.

Finale

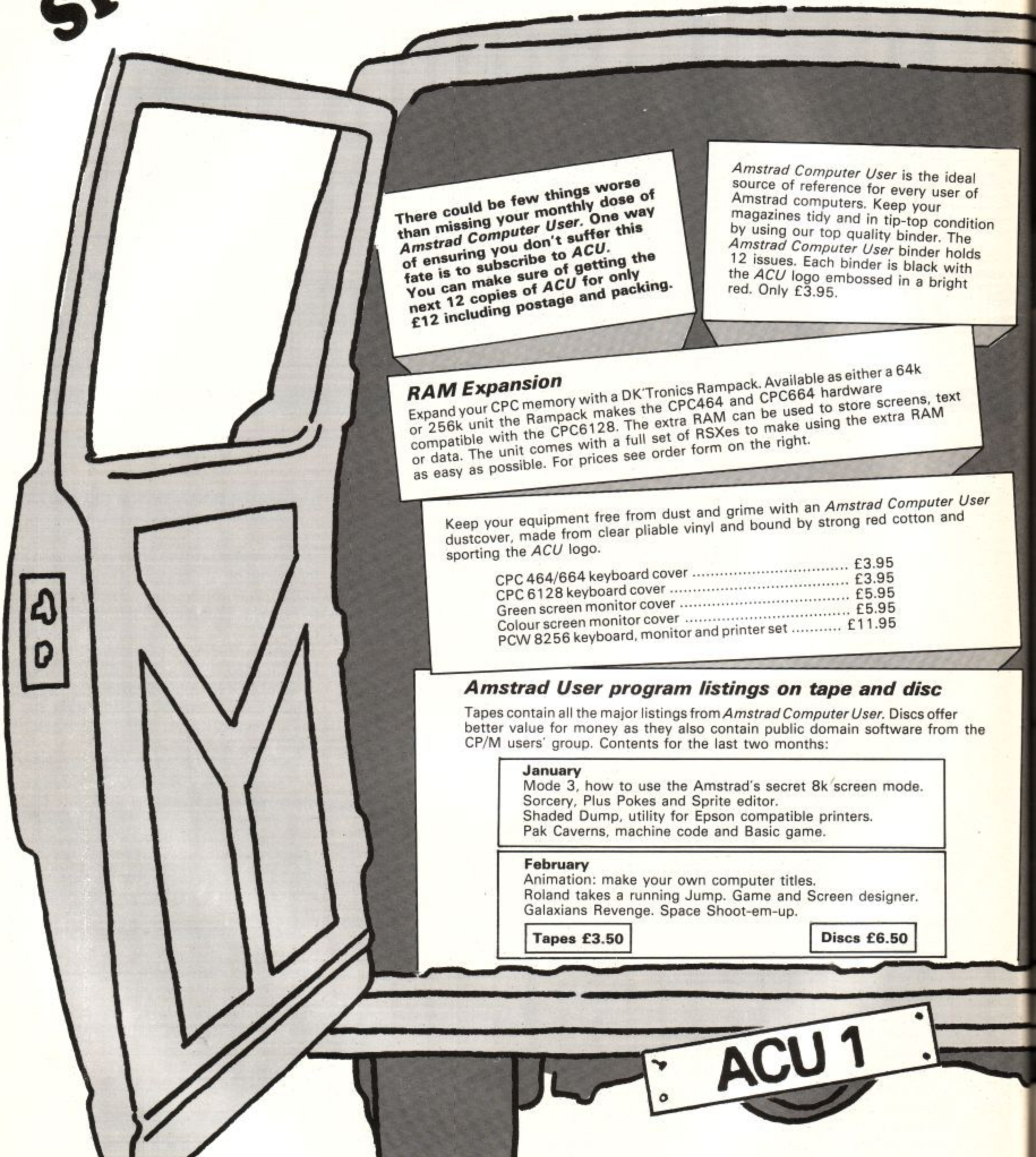
Rainbird intend to produce software which is a cut above the rest.They are not interested in games which are just a jolly good blast. They insist that there is a lot to each of their titles. There certainly is a lot to The Music System. A knowledge of music is helpful, but you soon learn how to fly the program. There will be an advanced system, called logically enough The Advanced Music System. This will load in each module from disc (no tape version) and have more room for tunes, a printer module and a linker to allow you to join together several files and make a really long tune.

The Music System costs £14.95 for the tape and £19.95 for the disc version, which given the extra cost involved in duplicating discs means that tape users are subsidising disc users. The Advanced Music System will cost £29.95 but there should be a discount for anyone who wants to part-exchange a standard Music System.

Even if you are only going to fiddle with music it is great fun to take a song-sheet and type in the tune, watching the notes scroll by. If you have any serious use for a music program it is a must. Add it to your Chopin list.



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The Least Significant Bit

It's all happening

We all know this is a fast moving business, but the rate at which things have been happening in and around the Amstrad scene since just before Christmas defies all belief. The sale of this noble organ (ACU to you lot); the sale of Amsoft to a new company created for the purpose; Alan Sugar's award as "personality of the year" in the RITA ceremony. Where will it all end?

It's not all happening

About the only thing that didn't happen was the expected gong for Alan Sugar in the New Year's Honours. What with Bob Geldof and Alan Sugar being left out, maybe a sunny demeanour and joyful disposition count more in such things than a proven ability and desire to "get on with it" and cut out the crap.

At least Imagine software pioneer Bruce Everiss wasn't made a Viscount, although the rumour that the ribbon attached to the insignia wouldn't fit over his head is not entirely without foundation.

It's all happened

And then there was the outbreak of exhibitionism that fell upon us all just after we had recovered from Christmas and the New Year. The first question one weary exhibitor asked the organiser of the Novotel ACU Show was if he dared to announce the time of the next Amstrad User Show. After all, it was during the first evening of the first ACU show that Peter Brameld stood up to jeers from the assembled throng who had just endured a day in something akin to the black hole of Calcutta (were you there? Everyone else appeared to be) to announce that there was to be another one just after Christmas.

So the tone of this enquiry was threatening – if not downright homicidal. However, two days and a good few rattles of the till later, the inevitability of the next ACU show was not too serious a matter for most of the exhibitors.

And then there was the Which Computer? Show

Last year, the Which Computer Show at the Birmingham NEC got lost under a blanket of snow, and about three stray motorists and a lost sheep found their way in. Expectations for the 1986 event were therefore cautious.

As it happened the show was more vibrant and better attended than either PCW or Compec – both of these Olympia based shows beginning to suffer severely from the hopelessness of the parking situation, and the fact that Londoners are becoming very punchy about it all.

1985's PCW show really lost its way, and Compec annoyed most of the more interesting exhibitors by enforcing a curious scheme of software segregation. The Which Computer show managed to cheer up the entire industry, although the significance of the fact that Amstrad and Commodore were the two busiest stands was trying to be ignored by everyone else hawking their flavour of IBM PC clone or printer. My goodness, aren't there a lot of printers available these days?

So how curious that the most technically exciting and advanced product and the oldest and cheapest products should steal the show. (Actually it's not at all curious, but don't tell the other 200-odd exhibitors, let them find out the hard way that you either succeed by attracting new users in for the first time, or attract existing users by providing something quite startlingly new and eye catching.)

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